Astounding SCIENCE FICTION

CENTAURUS II

BY A. E. VAN VOGT

JUNE 1947

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Reg. U. S. Pat. Off.

STREET & SMITH'S ASTOUNDING SCIENCE-FICTION JUNE 1947

PICTURE QUIZ: Which one of these people gives the right reason for buying U.S. Bonds?

(ANSWER BELOW)

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THE ANSWER

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MUFFED CHANCES

In the 1870s, Crookes, Faraday, and a dozen other major experimental physicists were playing with the fascinating mysteries of the cathode-ray tube. Crookes showed that the mysterious agency in the tube would push a little paddlewheel around. It was known that the radiation, whatever it was, traveled in straight lines. They showed that by setting up a little metal cross between the cathode and anode, the glowing anode was shadowed by the metal cross.

Twenty-five years later, somebody finally got around to making the shadow of the metal obstruction cover all but one small spot on the anode—and the modern form of the cathode-ray tube was almost finished. Within a few years after that small switch—from large luminous area-small shadow to large shadow-small luminous area—the electron had been nailed down.

Again almost fifteen years elapsed before the next step was made—and it was made almost accidentally, and from an entirely different line of attack. Lee DeForest didn't even consider the cathode-ray tube when he invented the triode amplifier tube—yet a cathode-ray tube beautifully and visibly demonstrates the basic phenomenon.

In the 1870s, no one could guess that the cathode-ray tube was one of the greatest of scientific investigation tools. But, on the other hand, electric power was beginning to come in, and physicists were needed to figure out why a certain type of motor worked better than another, and what could be done about making an electric arc light small, safe, and cheap enough for home lighting. Then when Edison showed that the arc light wasn't the answer, physicists had to find better materials for incandescent lights. Of course, in the process of discovering the cathode-ray tube, physicists had invented the gas-glow discharge tube, and a German glass blower, Herr Geisler, had done everything but shape them into advertising signs of the modern "neon" type. (He didn't use neon, however; it hadn't been discovered. But he did make them in whirls, loops, spirals, bulbs, knots and whatnot. He had red, green, yellow, blue and anything else you wanted, including pure white.) But despite their knowledge of the gas-glow tube, the very difficult problem of the in-

candescent lamp was tackled and, eventually, solved before science and engineering finally got around to going back to the ultramodern fluorescent lamp, and to the still newer cold-cathode fluorescent. (And that, friends, is a perfectly straight, unmodified Geisler tube—with improved fluorescent materials. They could have made the things in 1870!)

Diverted into these new fields—and into the study of electromagnetic radiation, ably led by Clerk Maxwell and Heinrich Hertz—they parked the cathode-ray tube on the discarded apparatus shelf, and forgot it for a full quarter century.

Let's see what they might have done. If they'd made the pinhole bright-spot type of cathode-ray tube in 1875, the electron would have been pinned down in 1880. They would have known about electron-beam deflection by magnetic and electric fields; Maxwell's electromagnetic equations would have made more sense to them.

In 1879, let's say, some bright lad in the laboratories tries the effect of applying a charge of the metal disk-with-a-hole that produces the bright spot on the glowing anode. In about ten seconds he'd discover that the effective size of the hole varied with charge applied to the plate. (The principle used to make light and dark portions in the picture on a television receiver tube. The cathode-ray beam is cut off or on by charge applied to the beam-defining hole in the tube's electron gun.)

From that, it wouldn't take too wild a leap of ingenuity to try putting a grid of parallel wires in the tube; by charging the wires differently, they could be made to pass varying numbers of electrons; the glow on the anode would vary visibly. And, incidentally, the current flowing through the tube would vary.

By 1885, a perfectly good triode amplifier tube could have been set up. Working at the thing from the cathode-ray tube approach, where the effect of grid wire size and spacing would have been visible, considerably faster progress could have been expected.

I won't say that radar would have been used in the Spanish-American war—but Hertz had used the basic radio-reflection principles long before that time, in his original experiments.

Certainly, by dropping the cathode-ray tube just when they did, at just the critical point, they muffed the big chance.

Time after time in science, the same thing has happened. Because we never know just which laboratory gadget is the rough form of the key to a great domain, we muff one great chance after another.

Wonder which obscure, discarded bit of apparatus now in some closet is the one we're muffing today? And what's the domain it would open to us, properly developed? Gravity? A couple of new radiation spectrums? Or something whose very existence we haven't imagined?

The Editor.

CENTAURUS II

BY A. E. van VOGT

***Given** perfect ships, perfectly capable of years of exploratory cruising—still men wouldn't find interstellar exploring simple. There are other problems than ships—*

Illustrated by Schneeman

Out of the corner of one eye, Lesbee saw Ganarette climbing the steps that led to the spaceship's bridge. He felt vaguely annoyed. Ganarette, at nineteen, was a big, husky youth with a square jaw. Like Lesbee himself, he had been born on the ship, and he had the peculiar walk of the hundred-odd young people aboard. As a non-officer he was not allowed on the bridge, and it was that, entirely aside from his own personal dislike of Ganarette, that annoyed Lesbee about the intrusion.

Besides, he was scheduled to go off duty in five minutes.

Ganarette mounted the final step,

and climbed gingerly down to the cushiony floor. He must have been intent on his task, for when he looked up, he gasped and then stood teetering a dozen feet from Lesbee, staring into the darkness. His reaction startled Lesbee. It hadn't struck him before, but there were actually people on this ship whose only view of space had been by way of the visiscreen.

The sheer stark reality of the transparent plexiglass bridge, with its effect of standing right up in dark, empty space itself, must be mind-staggering. Lesbee had a vague feeling of superiority. He had been allowed on the bridge since early childhood.

It seemed as natural and right as the ship, as ordinary as life itself.

He shrugged. He looked at Ganarette. He saw that the other was recovering.

"So," said Ganarette, "This is what it's really like. Which is Centaurus?"

Stiffly, Lesbee pointed out the very bright star along the sight lines of the engine-aiming devices. Stiffly, because the unusualness of this visit of Ganarette's was beginning to penetrate. He wondered, since such visits were absolutely forbidden, if he should report to his father, Captain Lesbee?

He shook his head ever so slightly. It would be unwise to antagonize the young people on the ship. As the captain's son, he was already being treated as a person set apart. He could see himself repeating his father's lonely existence.

In a few minutes, his period of duty over for another day, he would lead Ganarette gently, but firmly, down the steps, and give him as friendly a warning as possible. He saw that the youth was looking at him, grinning. But all Ganarette said was:

"And which is Earth?"

The pale star held his interest for nearly a minute. He slumped a little, then whispered:

"It's so far away, so very far away. If we started back now, I'd be forty years old when we got back, and you'd be forty-two."

He whirled, and grasped Lesbee's shoulders with fingers that bit in with a metallike strength.

"Think of it!" he said. "Forty-two years old. Half of our life gone, but still a chance to have a little fun—if we turn back this instant."

Lesbee freed himself from the clamping fingers. He was startled. It was more than a year since he had heard that kind of talk from any of the younger folk. Ever since his father initiated the lectures on the importance of this, the second voyage to Alpha Centaurus, the wilder spirits among the youths had quieted down.

Ganarette seemed to realize that he was being foolish. He stepped back with a sheepish grin, then sardonically:

"But, of course, I'm forgetting. It would be silly to turn back now when we're only nine years from Centaurus, a mere eighteen years farther from Earth. After all,

these days a man of sixty is practically a young man."

Lesbee wasn't sure that he liked the irony. But he was not prepared to get into an argument. He had had such thoughts himself and deep in his being were vestiges of horror at the idea that he was doomed to spend two-thirds of his life on the trip from Earth to Centaurus and back.

With trembling fingers, he looked at his watch. He turned, and switched on the automatics. His duty period was over. Now, for twelve hours, electronic machinery would take over. Then Carson would assume the watch for six hours. The first officer would be followed after twelve hours by the second officer, who in turn would be followed by Browne, the third officer. And then, when another twelve hours of automatics had gone by, it would be his own turn again.

Such was the pattern of his life, and so it had been since his fourteenth birthday. Now, he would just have time to wash up, before the movie show started. He grew aware that Ganarette was looking at the clock on the low-built control board.

He faced Lesbee decisively. "O.K., Jim," he said, "you might as well get it now. Five minutes after the motion picture starts showing, my group is taking over the ship. It is our intention to make you captain, but only on the condition that you agree to turn back to Earth. We won't hurt any of the old fogies—if they behave. If you try to warn anybody, we shall reconsider our plan to make you captain.

"That's all. Let's go down now to the theater. But remember what I said. Watch yourself. Be as surprised as the others, but be prepared to step in and take command."

Lesbee sank heavily into his seat. All around him in the darkness of the theater people were fumbling to their places. He had time for his first real thought: If he was going to do anything, he had better act swiftly.

Ganarette crushed into the seat beside him. He leaned towards Lesbee. "Only a few minutes now, as soon as everybody is in. Then the lights go on."

A buzzer sounded. "Ah," whispered Ganarette, "the picture is going to start."

The sense of inexorable time pressing him to decision was strong in Lesbee. He stirred in his seat, and wondered desperately if he couldn't escape in the darkness. He gave that up, for his eyes were accustoming to the night of the theater, and it was not really dark at all. Over to one side he could see Third Officer Browne and his wife sitting together. The older man caught his distracted gaze and nodded.

Lesbee grimaced a smile, then turned away. A moment later, he saw First Officer Carson sitting near the back of the theater. Lesbee senior hadn't arrived yet, and the second officer must be one of the slumped figures nearer the front, but the theater had its usual packed look. Three times a "week" there

was a show. Three times a week the five hundred people on the ship gathered from every corner of the spaceship and gazed silently at the scenes of far-off Earth that glided over the screen.

Seldom did anyone miss the show. His father would be along any minute.

Lesbee settled himself to the inevitability of what was about to happen. On the screen a light flickered, and then there was a burble of music. A voice said something about "an interesting trial," and then there were some printed words and a list of technical experts. At that point Lesbee's mind and gaze had wandered back to his father's reserve seat.

It was still empty.

The shock of that was not just an ordinary sensation. It was a blow that punched along his nervous system, astonishment mingled with an empty sense of imminent disaster, the sudden tremendous conviction that his father knew of the plot.

He felt his first disappointment. It was an anguish of bitter emotion, the realization that the trip would go on.

His feelings caught him by surprise. He hadn't realized the depth and intensity of his own frustration aboard this ship seven thousand eight hundred days out from Earth. He whirled to word-lash Ganarette for having made such a mess of the plot.

Just in time he stopped that rush of fury.

If the rebellion was destined to fail, it wouldn't do to have made a single favorable remark about it.

He settled back in his seat with a sigh. The anger passed. He could feel the disappointment fading, and rising up in its place an acceptance of the future.

On the screen, somebody was standing before a jury and saying, ". . . The crime of this man is treason. The laws of Earth do not pause inside the stratosphere or at the Moon or at Mars—"

Once again, the words couldn't hold Lesbee. His gaze flashed to Captain Lesbee's seat. A sigh breathed from his lips as he saw that his father was in the act of sitting down. So he didn't suspect at all. His late arrival was a meaningless accident.

Within seconds the lights would flash on, and the young men would take over the ship.

Curiously, now that there was no chance of doing anything, he was able to give his attention for the first time to the screen. It was as if his mind was anxious to escape from the slow sense of guilt that was building up inside his body. He looked outside rather than in.

The screen was still a courtroom. A very pale young man was standing before a black be-capped judge. And the judge was saying:

"Have you anything to say before sentence is pronounced upon you?"

The reply was haltingly delivered: "Nothing, sir . . . except we were so far out . . . it didn't seem as if

we had any connection with Earth—After seven years it just didn't seem possible that the laws of Earth had any meaning—"

It struck Lesbee that the theater was deathly quiet, and that the rebellion was many minutes overdue. It was then as he listened to the final words of the judge that he realized there would be no rebellion. The judge in that remote Earth court was saying:

"I have no alternative but to sentence you to death in the atomic converter."

After the whole show was over, Lesbee made his way to the projection room.

"Hello, Mr. Jonathan," he said to the slim fortyish man who was busy putting away his cans.

Jonathan nodded politely. His face showed a distinct wonder that the captain's son should have sought him out. His expression was a reminder to Lesbee that it didn't pay to neglect *any* one aboard a ship, not even people you considered stupid and unimportant. Lesbee swallowed, then:

"Odd picture you showed there at the beginning," he said casually.

"Yeah." The cans were being shoved into their protective cases. "Kind of surprised me when your dad phoned up and asked me to show it. Very old, you know. From the early days of interplanetary travel."

Lesbee said something, he couldn't remember what. His mind was humming. He went out without looking where he was going. Weeks were to pass before he admitted to himself how impressed he was.

His admiration for his father actually began on that day.

For weeks they had been slowing down. And, day by day, the bright stars in the blackness ahead grew larger and more dazzling. The four suns of Alpha Centauri no longer looked like one brilliant diamond, but were distinct units separated by noticeable gaps of black space.

They passed Proxima Centauri at a distance of two billion eight hundred million miles. The faint red star loomed vast in the interstellar radar telescopes, then slowly retreated behind them.

Not Proxima the red, the small, but Alpha A was their first destination. From far Earth itself the shadow telescopes had picked out seven planets revolving around A. Surely, of seven planets, one would be habitable.

When they were still four billion miles from the main system, Lesbee's six-year-old son came to him in the hydroponic radiation gardens.

"Grandfather wants to see you, Dad, in the captain's cabin."

Lesbee nodded, and noted that the boy ignored the workers in the garden. He felt vaguely pleased. It was well for people to realize their station in life. And, ever since the boy's birth, several years after the crisis created by Ganarette, he had consciously striven to instill the proper awarenesses into the youngster.

The boy would grow up with that

attitude of superiority so necessary to a commander.

Lesbee forgot that. He tugged the youngster along to the playground adjoining the residential section, then took an elevator to the officers' deck. His father, four physicists from the engineering department, Mr. Carson, Mr. Henwick and Mr. Browne were in conference as he entered. Lesbee sank quietly into a chair at the outer edge of the group, but he knew better than to ask questions.

It didn't take long to realize what was going on. The sparks. For days the ship had been moving along through what seemed to be a violent electrical storm. The sparks spattered the outer hull from stem to stern. On the transparent bridge it had become necessary to wear dark glasses; the incessant firefly-like flares of light upset the muscular balance of the eyes, and caused strain and headache.

The manifestation was getting worse, not better.

"In my opinion," said the chief physicist, Mr. Plauck, "we have run into a gas cloud—as you know space is not really a vacuum, but is filled, particularly in and near star systems with free atoms and electrons. In such a complicated structure as is created by the Alpha A, B, C and Proxima suns, gravity pull would draw enormous totals of gas atoms from the outer atmospheres of all the stars, and these would permeate all the surrounding space.

"As for the electrical aspects apparently a disturbance, a flow, has been set up in these gas clouds, possibly even caused by our own passage, though that is unlikely. Interstellar electrical storms are not new."

He paused. He glanced at one of his assistants, questioningly. The man, a mousy individual named Kesser said:

"It happens that I am in disagreement with the electrical storm theory, though I, too, agree on the presence of masses of gas. After all, that is old stuff in astronomy. But now—my explanation for the 'sparks':

"As long ago as the middle twentieth century it was theorized that the gas molecules and atoms floating in space readily interchanged velocity for heat, or heat for velocity. The temperatures assumed for these free particles were about twenty thousand degrees Fahrenheit."

He looked around, momentarily very unmouselike. "What would happen if a molecule holding such a temperature struck our cold ship? Sparks, of course."

He paused. He was a graying man with a hesitant way of speaking. He finished:

"And then, of course, we must always remember the first Centauri expedition, and be careful."

There was a chilled silence. It was strange, but Lesbee had the impression that, though everybody had been thinking of the first expedition, nobody had wanted it mentioned.

Lesbee glanced at his father.

Captain Lesbee was frowning, staring at the floor. The commander had grown more spare with the years, but his six feet three inches of height still supported two hundred pounds of flesh. He looked up, and said:

"It is taken for granted that we shall be cautious. One of the purposes of this voyage is to discover the fate of the first expedition." His gaze flashed towards the group of physicists. "As you know," he said, "that expedition arrived at Alpha Centauri nearly seventy-five years ago. We are assuming that, no matter how violent its ending, even if it fell through the atmosphere of a planet completely out of control, that some trace of its presence will remain. The question is, what would survive after three quarters of a century?"

Lesbee was dimly amazed at the various answers. There were so many things that the physicists expected to survive. The "pile" engines. All electronic detectors and broadcasters mounted in metallic print. "Printed instruments can withstand gravities of 800 G's." The shell of the ship? Its survival would depend on the velocity of the ship as it fell through the planet's atmosphere. It was theoretically possible that the speed would be vast beyond all safety limits. At such immense speeds, the entire machine would go up in a puff of heat energy.

But that was not what the experts anticipated. There should be something. "We should be able to trace the ship within hours of arriving at the planet where it had crashed."

As the men got up to leave, Lesbee caught his father's signal for him to remain behind. When the others had gone, the older man said:

"It is necessary to make plans against a second rebellion. There is a scheme afoot to evade our connection with Earth law by establishing a permanent colony on Centaurus, and never returning to Earth. And this time the rebels do NOT intend to make you captain. Let us, therefore, discuss tactics and strategy—"

Watch duty became a nightmare. The three chief officers and Lesbee divided it into three-hour shifts that ran consecutively now. They wore semispacesuits for protection when they were on the bridge, but Lesbee's eyes at least never stopped aching.

During his sleep period, he dreamed of sparks dancing with unsteady beat under his eyelids, and there was a picture of a successful mutiny led by Ganarette, somehow surprising them in spite of their preknowledge.

It was miraculous enough that his father knew as much as he did about the plot.

The speed of the ship came down to interplanetary levels. And, slowly, they drew near the planet they had selected for a first landing. It was the only possible selection. Of the seven planets in the system, six had already been measured as being of Jupiter size; this seventh one had a diameter of ten

thousand miles. At 120,000,000 miles from Alpha A, a sun fifteen per cent hotter than Sol, it almost approximated Earth conditions. There was the added complication of the pale but sun-sized star, Alpha B, visible in the blackness little more than a million miles to one side; and the almost invisible C, too, would have its effect. But that scarcely mattered beside the wonderful fact that here was a planet of approximately the right size, and even at a distance it glowed with a jewellike atmosphere.

At four thousand miles from the surface of the planet, the giant *Centaurus II* was maneuvered into a fast orbit—and the preliminary study of the planet began.

Nobody had any fun. What should have been the thrill, literally, of a lifetime was a fearful fight against mounting tension. Lesbee accompanied his father to the instrument room for one visit only. In spaceships the principle of alarms that affected both ear and eye was long established practice. The vast room hummed with pulsing energies. Men moved around with faces strained by the incessant grating sound.

Kesser, looking like a shriveled edition of a human being, came dragging over.

". . . The sooner we get into the safety of the atmosphere, the better I'll like it."

Lesbee had the same feeling, but his father only shook his head.

"You were just out of college, Mr. Kesser, when you signed up for the voyage. You have not that awareness of the standards of precaution by which the navy acts."

He added grumpily, "That is the trouble aboard this ship. Those who were born during the trip will never during their lifetime begin to understand what efficiency is."

He finished: "I do not plan to leave this orbit for at least two weeks, possibly even longer."

As the days passed, the information began to come in. The planet's atmosphere had a strong greenish tinge, and this was identified as chlorine. There was a great deal of oxygen in the stratosphere, and the comparison which everybody made was that here was another, but more bounteous Venus, where masks would have to be worn against the irritating chlorine.

No final test of the percentage of either gas present could be made at this height. Only at sea level or thereabouts would a proper measurement tell the final story.

At four thousand miles, the difference between water and land was sufficiently distinguishable for a photographic map to be made. Cameras, taking thousands of pictures a second, obtained views entirely free of sparks.

There were four main continents, and islands uncountable. Fifty-nine hundred cities were large enough to show clearly despite the distance. They were not lighted at night, but that could have been because there was no light in the Earth sense. When Alpha A was not shining down on the continents below, either Alpha B or Alpha C

or both were always shedding some equivalent of daylight.

"We mustn't assume," said Captain Lesbee, in one of his daily talks on the broadcasters, "that the civilization here has not discovered electricity. Individual lights in houses would not necessarily be visible if they weren't used often."

These talks, Lesbee discovered, did not serve the function that his father intended. There was a great deal of criticism, a feeling that the commander was being too cautious.

Said one man, "Why don't we run down, collect some samples of the atmosphere, and get this uncertainty over. If we can't breathe that stuff down there, let's find it out, and get started home."

In spite of his confidence in his parent, Lesbee found himself sharing the sentiment. Surely, the people below would not take violent offense. And, besides, if they departed immediately—

Privately, his father informed him that the mutiny had been called off pending developments. The rebel plan, to settle forever, was shaken by the possibility that the planet might not be suitable for human beings, and that in any event permission to settle would now have to be secured from the present inhabitants.

"And, though they won't admit it," said the commander, "they're afraid."

Lesbee was afraid, too. The idea of an alien civilization made his mind uneasy. He went around with an empty feeling in his stomach, and wondered if he looked as big a coward as he felt. There was only one satisfaction. He was not alone. Everywhere were pale, anxious faces and voices that quavered. At least he had his father's strong, confident voice.

He began to build up pictures of a nonmechanical civilization that would be dazzled and dominated by the tremendous and wonderful ship from Earth. He had visions of himself walking among the awed creatures like a god come down from the sky.

That vision ended forever on the ninth day after the orbit was established, when a general warning was sounded from every broadcaster on the ship:

"This is Captain Lesbee. Observers have just reported sighting a super-spaceship entering the atmosphere below us. The direction the ship was traveling indicates that it must have passed within a few miles of us, and that therefore we were seen.

"All officers and men will accordingly take up action stations.

"I will keep you informed."

Lesbee put on his suit, and climbed up to the bridge. The sparks were dancing like mad on the outside of the plexiglass, and it was a pleasure to sit down at the bridge directive board, and watch the screen that had been rigged up two days before by the physics department. The screen was fed pictures by the high speed cameras, but an electronic device eliminated every picture which had on it a spark. The speed of the pictures

made the scene appear continuous and uninterrupted.

It was Lesbee's first awareness that there was such a thing as a different way of arranging the equipment aboard the *Centaurus II*. He had read about invention, and adaptation of devices to new purposes, but that was of Earth.

Oddly, the discovery that it could be done aboard ship, too, brought an afterglow of irritation. Why hadn't the method been thought of at the very beginning of the sparks?

His criticism ended. There was a flash of brightness ten miles away at the lower end of the screen.

A ship.

Its speed of approach must have been miles a second, for a quick trailer punch on a side screen failed to show the slightest sign of it in the heavens. One instant it wasn't within two hundred miles, the next instant, in spite of watchful cameras, it had hove-to in the near distance.

Captain Lesbee's voice came quietly from the broadcaster:

"Apparently, these beings have discovered a drive principle that enables them to dispense with gradual starts and stops. They must be able to attain interstellar maximum velocities within minutes of leaving their atmosphere."

Lesbee scarcely heard. He was watching the alien ship. He did remember thinking that it took the *Centaurus II* weeks and weeks to accelerate and decelerate, but that thought quickly blanked out; the comparison was too unfavorable

Once again, there was only the ship ahead.

With a start he saw that it was larger.

Closer.

Sharply, the commander's voice came:

"Torpedo crews load! But take warning: Any officer firing without orders will be executed. These people may be friendly."

Silence reigned on the bridge while the two ships approached within two miles of each other. Then a mile, then half a mile. Lesbee licked dry lips, then glanced at First Officer Carson, sitting in the chair beside him, glaring into the screen. The older man's bearded face showed little or no emotion.

Captain Lesbee's voice came on the broadcaster behind them:

"I want all weapon officers to listen carefully. The following order applies only to torpedo chamber A, under the command of Technical Gunnery Mate Doud. Doud, I want you to drop an air-filled torpedo. Understand me? Drop it. Don't fire it.

"Drop it, let it ease out several hundred yards, so they can't miss seeing it, then keep it under radio control cruising around in a narrow area of about two hundred feet."

The commander explained quietly to his audience: "This action will apprise the other ship that we have weapons, but are not using them in aggressive action. Their response will indicate whether or not their quiet approach was a friendly or a cunning one. It might also give

us some information which we desire, but I won't develop on that at the moment.

"Do not be alarmed. All our screens and defenses are up. They represent Earth's mightiest science."

That was briefly reassuring, but the empty feeling came back, as a hard, tense voice sounded on the broadcasters:

"This is Gunnery Mate Doud. Somebody's trying to take the radio control of the torpedo away from me."

"Let them have it." That was Captain Lesbee, quick as a flash. "They've obviously discovered it is harmless."

Lesbee watched as the Earth torpedo was drawn toward the hull of the larger ship. A hole yawned in its side, and the torpedo floated inside.

A minute passed; two; and then the torpedo emerged, and slowly approached the *Centaurus II.*

Lesbee waited, but he didn't actually need words now. For the first time, in all this long voyage, something of the tremendousness of this meeting of the civilizations of different suns struck him. For the first time in all those years the trip took on meaning, and the wonder of himself being on the scene.

Of the multibillions of Earth-born men, he was here on the frontier of man's universe participating in the greatest event in the history of the human race.

Suddenly, it seemed to him, he understood the pride of his father in this voyage.

Suddenly, he realized how great an honor it had been for the man who received the command of the *Centaurus II.* An entire generation of adventurous minded men must have envied the lucky few who thirty years before had launched themselves into the blackness of interstellar space.

For a moment, sitting there, his fear gone, Lesbee shared that pride, and felt a joy beyond any emotions he had ever had.

The feeling ended, as Captain Lesbee's voice came curtly:

"I am limiting this call to officers and the science department. I want, first, Doud to try to take control again of the torpedo. See if they'll let it go. Immediately."

There was a pause; then: "Got it, sir."

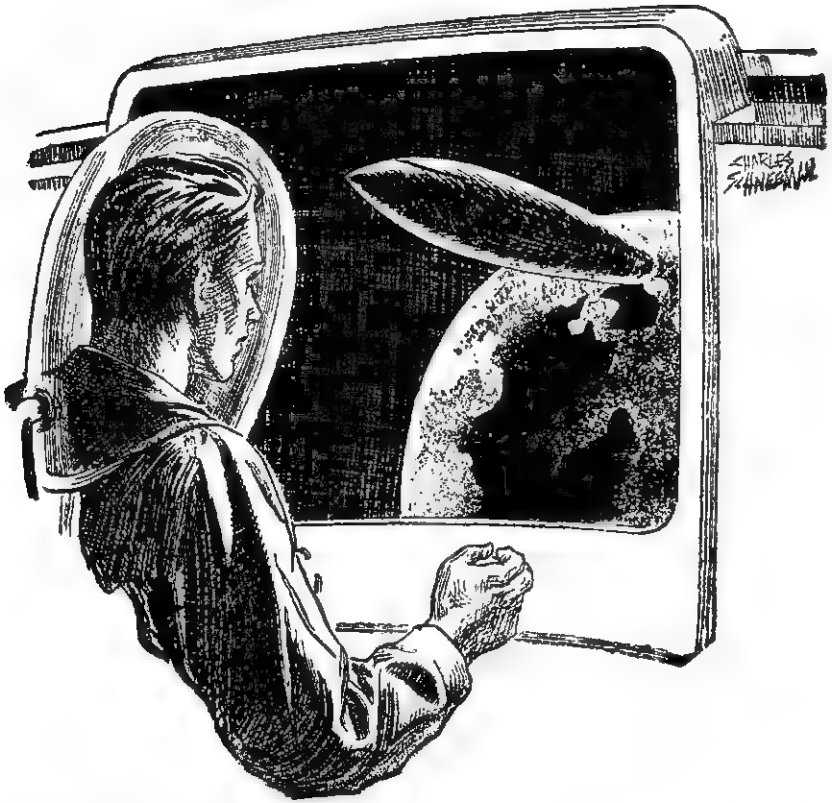
"Good." Captain Lesbee's voice was triumphant. "I want the atomic men to test it with everything they've got. Actually, *they* didn't have time to put in a death charge of anything, but we've got to make sure, before we pull it back in to the ship—not afterwards."

Silence again, then Plauck's voice:

"Seems to be nothing, captain." He must have realized that was too weak. "There is nothing dangerous inside," he said flatly.

The captain was intent. "Doud, bring it inside. Do not open it. I want the air inside drained off and analyzed by the chemical bureau. At once. All personnel will remain at battle stations."

For an hour, then, the broad-



casters were silent. When they finally came to life again, Captain Lesbee said grimly:

"I want Jim and Mr. Browne to come to my cabin, armed."

When Lesbee arrived, followed a moment later by Browne, the commander did not hesitate.

"Gentlemen," he said quietly, "I wish you to accompany me to effect the arrest of Ganarette on a charge of mutiny."

The words seemed absolutely unconnected with what had just happened, but Lesbee went along without a demur.

He did wonder if his parent had gone insane.

The trial of Ganarette began shortly after the breakfast hour on the following sidereal day. The *Centaurus II* was still in her orbit around Alpha A-4, but the alien machine had disappeared. And so the people of the ship could devote themselves to the trial itself.

The extent of the evidence startled Lesbee. Hour after hour records of conversations were reeled off, conversations in which Ganarette's voice came out sharp and

clear, but whoever answered was blurred and unrecognizable.

"I have followed this policy," Captain Lesbee explained to the silent spectators, "because Ganarette is the leader. No one but myself will ever know the identity of the other men, and it is my intention to forget, and act as if they did not participate."

The records were damning. How they had been recorded Lesbee could only guess, but they had caught Ganarette when he believed himself to be absolutely safe. The man had talked wildly on occasion about killing anybody who opposed them, and a dozen times he advocated the murder of the captain and the two chief officers and Lesbee's son.

"They have to be put out of the way, or they'll make trouble. The sheep on this ship just take it for granted the Lesbees do the bossing."

Emile Ganarette laughed at that point, then he stared boldly at the spectators.

"It's the truth, isn't it?" he said. "You bunch of idiots take it for granted that somebody can be appointed to boss you for your entire lives. Wake up, fools! You've only got one life. Don't let one man tell you how to live it."

He made no effort to deny the charge. "Sure, it's true. Since when did you become God. I was born on this ship without being asked whether I wanted to live here. I recognize no rights of anybody to tell me what to do."

Several times he expressed the puzzlement that was slowly growing in Lesbee's own mind:

"What is this all about? This trial is silly, now that we've discovered the Centaurus system is inhabited. I'm fully prepared to go back to Earth like a good little boy. It's bad enough to know that the trip was for nothing, and that I'll be sixty years old when we get back. But the point is, I do recognize the necessity now of going back. And, besides, there was no mutiny. You can't try me for shooting off my face, when nothing actually happened."

Towards the end Lesbee watched his father's face. There was an expression there that he did not understand, a grimness that chilled him, a purpose that did not actually consider the evidence, except as a means to a hidden intention.

When dinner was less than an hour away, the commander asked the accused a final question:

"Emile Ganarette, have you entered your complete defense?"

The big-boned young man shrugged. "Yeah, I'm through."

There was silence, then slowly Captain Lesbee began his judgment. He dwelt on the aspects of naval law involved in the charge of "incitement to mutiny." For ten minutes, he read from a document, which Lesbee had never seen before, which his father called the "Articles of Authority on the *Centaurus II*," a special law passed by the elected Space Board of the Solar System:

". . . It is taken for granted that

a spaceship is always an appendage of the civilization from which it derives, and cannot ever be considered as a sovereign power in its own right, its commanders and its purposes subject to the elective whims of the few individuals who happen to be aboard. . . . A spaceship is dispatched by its owners or by a sovereign government. . . . Its officers are appointed. . . . It is governed by rules and regulations set up by the Space Board. . . ."

There was much more, but that was the gist. The laws of a remote, lifetime distant planet applied aboard the spaceship.

And still Lesbee had no idea where his father was pointing his words. Or even why the trial was being held, now that the danger of mutiny was over.

The final words fell upon the audience and the prisoner like a thunderbolt:

"By right of the power vested in me by the peoples of Earth through their lawful government, I am compelled to pass judgment upon this unfortunate young man. The law is fixed. I have no alternative but to sentence him to death in the atomic converter. May God have mercy upon his soul."

Ganarette was on his feet. His face was the color of lead.

"You fool!" he quavered. "What do you think you're doing?" The deadliness of the sentence must have sunk in deeper, for he shouted: "There's something wrong. This guy has got something up his sleeve. He knows something we don't know. He—"

Lesbee had already caught his father's signal. At that point, he and Browne and Carson, and three special M.P.'s hustled Ganarette out of the room. He was glad for the chance at movement. It made thinking unnecessary.

Ganarette grew bolder as they moved along the corridors, and some of his color came back.

"You won't get away with this!" he said, loudly. "My friends will rescue me. Where are you taking me, anyway?"

It was a wonder that had already struck Lesbee. Once more, the quick-minded Ganarette realized the truth in a flash of insight.

"You skunks!" he gasped. "you're not going to kill me *now*."

The vague thought came to Lesbee that an outsider would have had difficulty distinguishing the prisoner and his captors by the amount of color in their cheeks. Everyone was as pale as death. When Captain Lesbee arrived a few minutes later his leathery face was almost white, but his voice was calm and cold and purposeful:

"Emile Ganarette, you have one minute to make your peace with your God . . ."

The execution was announced just before the sleep hour, but long enough after dinner to prevent physical upset.

Lesbee did not eat dinner. He spent the evening in his bathroom, bringing up his lunch.

Lesbee awakened the following day from his uneasy sleep to the

realization that his "call" alarm was buzzing softly.

He dressed, and headed immediately for the bridge.

As he sank into the seat beside Browne, he noted with surprise that the planet, which had been so close, was nowhere to be seen. A glance at the mighty sun, Alpha A, brought another, more pleasant surprise. It was receding, already much smaller. The three suns A, B and C were still not a unit, but only one, the dim C, was still ahead; the other two swam like small, bright lights in the blackness behind them.

"Ah," said Captain Lesbee's voice from the broadcaster, "there you are, Jim. Good morning."

Lesbee acknowledged the greeting diffidently. He was not too pleased at the attempt at friendliness, and no longer sure that he liked his father. However wildly Ganarette might have talked at times, it was hard to forget that they had grown up together.

Besides, Ganarette had been right! After the threat of mutiny was past was hardly the time to execute.

The finale had come too swiftly, Lesbee thought in agony. Given a chance to consider the sentence, he himself might have protested to his father.

The unseemly haste of the execution repelled him. The cruelty of it shocked him.

His father was speaking again: "While you slept, Jim, I had a specially constructed torpedo dropped into the atmosphere of A-4. I'm sure that everyone here would like to see what happened to it."

He did not wait for a reply. The picture on the screen changed. It showed the *Centaurus II* much closer to the atmosphere of the planet, and off to one side a bright gleam, where the torpedo was falling toward the haze of atmosphere below.

What happened then was puzzling. The robot machinery began to emit blue sparks. Relays closed and opened erratically. The torpedo began to twist and dive in meaningless jerks. Finally, when every relay was smoking, a spring device started a gas turbine, which provided power for a liquid oxygen rocket system.

The telescopes showed the torpedo as it slowly straightened its course, and, working now on a non-electrical source, turned and climbed back towards the ship. Part of the return journey was through a heavy rain flooding down on the eerie land below.

The torpedo rocketed to the vicinity of the ship, and was snatched by tractor beams and drawn aboard.

As the picture on the screen faded, Captain Lesbee climbed to his feet, and approached a long, canvas-covered object, which Lesbee had noticed when he first entered the bridge.

Very deliberately, the commander tugged the canvas aside.

It took a moment for Lesbee to recognize the scarred and battered

cigar-shaped thing that lay there as the once glistening torpedo.

Involuntarily, he approached it, and stared down at it in amazement. There were shocked murmurs from some of the other men. He paid no attention. The inch-thick hull of the torpedo was seared through in a dozen places as by intolerable fire. Behind him, a man said hesitantly:

"You mean, sir, that . . . atmosphere . . . down . . . . there—"

"This torpedo," said Captain Lesbee, as if he had not heard the interruption, "and presumably the *Centaurus I* ran into a hydrochloric acid and nitric acid rain. That's the famous and deadly mixture *aqua regia,* the dissolver of dissolvers. A ship made of platinum or lead, or covered with wax, could go down into an atmosphere capable of that kind of precipitation. And *we* could do it if we had a method of spraying our ship continuously with sodium hydroxide or other equally strong base. But that would only take care of that one aspect of the devil's atmosphere down there.

"You saw what happened to the electrical equipment aboard the torpedo." He glanced around at the expectant faces. "You understand," he said, "that I am coordinating information which I have received from several science departments."

He went on: "The natural electricity around this planet interflows on a colossal scale. For anything we've got, that air is an ionized hell. What the special explanation is, I don't know. One of the simplest methods of releasing chlorine from the various chlorides of metal is electrolysis. It is possible the plant life of A-4 uses chlorine to maintain its life, and releases electricity into the ground and air as a sort of excrement, which, in turn, causes the release of chlorine into the atmosphere.

"The planetary vastness of such a phenomenon would make for complication too great for us to figure out at this distance, and besides that is not what we are interested in."

He looked around again, gravely now. "Well, that's all, gentlemen. With that kind of erosion going on, the wreck of the *Centaurus I* would have suffered chemical changes that would make it unrecognizable to our instruments. We can assume that their atomic drives—operated as they are by electrical and electronic equipment—would have ceased to function as they entered the atmosphere, and they crashed here three quarters of a century ago. They found out the hard way that the Alpha Centauri system is not for man."

The words lifted Lesbee out of his tension. He had taken it for granted they would spend several years in exploration.

Now instead they would be going home.

He would see Earth before he died.

The excitement of that thought ended, as his father spoke again:

"Whatever the form of the

aliens, they were not very friendly. They warned us, but that could be because they had no desire for our big ship to come crashing down on one of their towns.

"They made no effort to communicate with us. The warning transmitted, they departed. Since then, we have seen two ships come up and disappear, apparently heading out to interstellar space. Neither of the ships made any effort to approach us."

He broke off, finished curtly: "I have no recourse but to follow the instructions given me by the Space Board before we left Earth. We will examine a few more planets here. Every time we see a ship we will approach it. If we are shunned, then we shall leave this system in approximately one month.

"We are not, however, going home.

"My orders are, to proceed to Sirius, then Procyon, and not till then return to Earth. Since we shall have only enough fuel to reach the vicinity of Sirius it will be necessary for us at some future date to use as fuel the interior decorations of the ship. This entire piece of information is not at the present time, not till I give permission, to be given to anybody aboard this ship.

"You can now see why it was necessary to execute the trouble-maker in our midst. The example made of him will restrain the hot-heads."

The intensity went out of his voice. He sounded suddenly tired, as he finished:

"Gentlemen, you have all necessary information. You will conduct yourselves with that decorum and confidence which is the mark of an officer regardless of the situation in which he finds himself.

"You have my best wishes—"

James Lesbee, the third, acting captain, sat in the great captain's chair, which he had rigged up on the bridge, and pondered the problem of the old people.

There were too many of them. They ate too much. They required constant attention.

It was ridiculous having seventy-nine people around who were over a hundred years old.

On the other hand, some of those old scoundrels knew more about science and interstellar navigation than all the younger people put together. And they were aware of it, too, the cunning, senile wretches.

"Let's see now, which ones could be killed without danger of destroying valuable knowledge? He began to write down names, mostly of women and nonofficers among the men. When it was finished he stared down at it thoughtfully, and mentally selected the first five victims. Then he pressed a button beside his chair.

After two minutes a heavy built young man climbed up the steps from below.

"Yeah," he said, "what is it?"

Lesbee III gazed at the other with carefully concealed distaste.

There was a coarseness about Atkins that offended his sensibilities, and in a curious fashion it seemed to him that he could never like the man who had killed his father, James Lesbee, Jr.—even though he himself had ordered the killing.

Lesbee sighed. Life was a constant adaptation to the reality of the inorganic and organic matter that made up one's environment.

In order to get a man properly murdered, you had to have a capable murderer. From a very early age he had realized that his nonentity of a father would have to be eliminated. Accordingly, he had cultivated Atkins.

The man must be kept in his place, of course.

"Atkins," said Lesbee with a weary wave of one hand, "I have some names here for you. Be careful. Do not make the mistake of making a mistake. The deaths must appear natural, or I will disown you as an inefficient fool."

The big man grunted. He was the grandson of one of the original workers in the hydroponic radiation gardens, and it had caused quite a stir when he had been relieved of his duties as a gardener some seven years before.

The resentment died quickly when the officer's son who protested the loudest was put to work in Atkins' place.

Lesbee had thought out things like that years before he acted against his father. His plan was to kill Atkins as soon as he had served his purpose.

With an aloof air, he gave the first five names, gave them verbally; and then, as Atkins withdrew down the steps, he turned his attention to the screen. He pressed another button, and presently the graying son of the old first officer climbed up to the bridge and came over to him, slowly.

"What is it—captain?"

Lesbee hesitated. He was not sure he liked the slight pause before the use of his title. He was not sure that he liked Carson.

He sighed. Life was a problem of so *many* adjustments, with everybody making a fetish of hoarding what knowledge they had. One had to put up with so much, and that was strange because he could remember in his own youth that people even then had been much more open-handed and open-hearted.

Why, the first generation had taught their children everything they knew—so it was said.

"Uh, Mr. Carson, what are the latest reports on Sirius?"

Carson brightened. "We are now within ten thousand billion miles. The ship has been swung around for deceleration purposes, but it will be a week yet before the telescopes will be able to determine definitely the size of the planets or whether they have atmospheres."

"Any, uh, radiation activity?"

Mr. Carson started to shake his head. He stopped. A curious expression came into his eyes. Lesbee twisted to follow his gaze.

Slowly, he stiffened.

The forward half of the plexi-

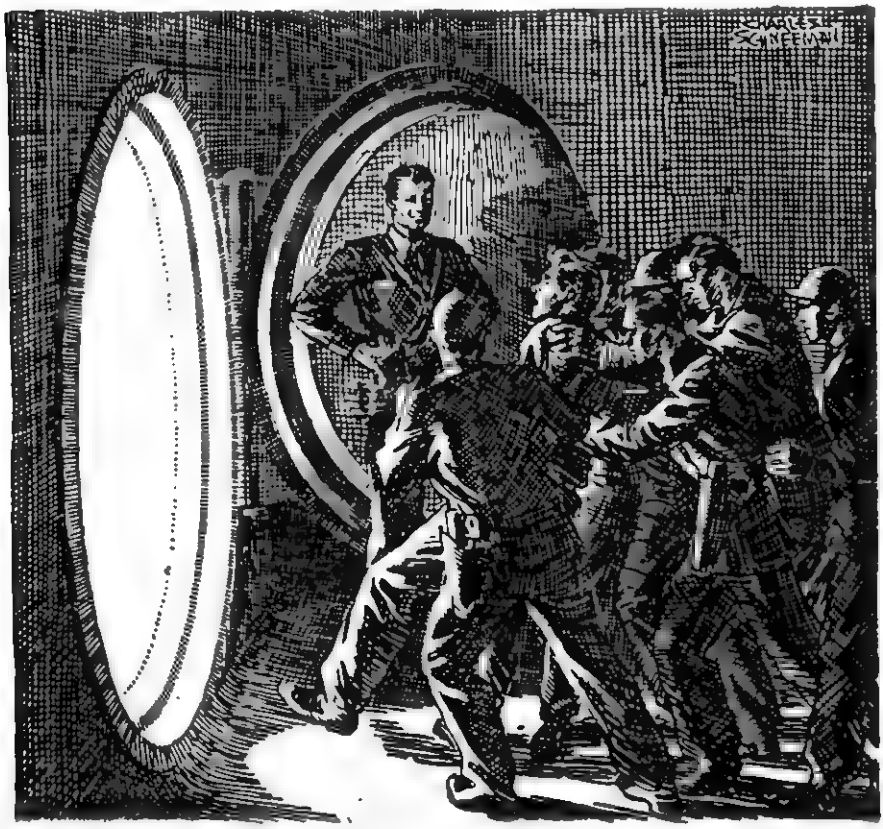
glass bridge was twinkling with a scattering of sparks. Even as Lesbee stared, they grew more numerous.

In an hour the gas storm had closed in around them.

Sirius A at five hundred million miles looked about the size of the Sun as seen from Earth. Lesbee III did not make the comparison from his own experience. There were motion picture views that provided a fairly exact standard for judgment. What was radically different was the planetary arrangement.

There were two planets between Sirius A and its companion sun. Their orbital speed was fantastically swift, the one nearest B having a velocity of nearly two hundred miles a second. The other one, which was four hundred and seventy million miles from A, had a velocity of just over one hundred and twenty-five miles a second.

It was this nearest planet that offered their only hope. With a



diameter of seventeen thousand miles, it was less than half the size of the second planet, and about one hundredth the size of the planets that swung weightily beyond the erratic orbit of Sirius B.

Lesbee III studied the reports, depressed but determined. It was clear that the universe had not been designed for the comfort and convenience of man. But he must be careful not to accept the implied defeat.

Reluctantly, he made his way to the cabin where, for long now, he had segregated his aged grandfather.

He found the old man sitting up in a chair, watching a small screen view of the planet that swung nearer and nearer. Possession of the screen was one of the many small courtesies which the younger man extended to the other, but so far it had produced no friendliness.

His grandfather did not look up as he entered. After a little, Lesbee walked over and settled himself in a chair facing the other.

He waited resignedly. It was hard when people misunderstood one's purposes. He had once thought his grandfather would understand, even if no one else did, that James Lesbee III had the interests of the trip at heart.

Perhaps it was too much to expect, though. Human beings were always willing to be objective—about other human beings; and so an old man resented the method by which he had been retired.

Some day, no doubt, he, Lesbee III, would be retired by Lesbee IV, now ten years old. It seemed to the young man in a sudden burst of self-pity, that when the time came he would accept the situation gracefully—provided it didn't happen too soon.

His annoyance passed. He launched his bombshell:

"Grandfather, I have come to ask your permission to announce that you will come out of retirement during the whole period that we are in the vicinity of Sirius, and that during that period you will direct the activities of the ship."

The long, thin, scrawny body moved, but that was all. Lesbee suppressed a smile. It seemed to him that his grandfather's mind must be working furiously. He pressed his purpose, as persuasively as possible:

"Throughout your life, sir, you have had but one purpose: to ensure that the voyage of the *Centaurus II* is completed according to the orders you received from the Space Board. I have read those orders, so I know what your feeling is. And I want to assure you that I understand fully the importance of this mission."

He shrugged. "Frankly, I like it aboard ship. Here, after your death—which I hope will never take place—I shall be commander. People used to be worried about the fact that there was one more girl in the third generation than there were men. I solved that problem very simply. I took a second wife. It was shocking for a

while, but now no one gives it a second thought."

He leaned back easily. "A voyage like this is something special. We're a little private world, and we have to make private adjustments to changing conditions."

He paused, and waited. But the old man said nothing. Lesbee smothered his irritation in an affable smile.

"You might be interested, sir, in the suggestions I have to make for our stay within the Sirius system. Naturally, it is already pretty certain that we cannot land here. That atmosphere below is saturated with sulphur. Just what that would do to our ship I don't know. But one thing is certain. We've got to find out right here where we go next."

It seemed to Lesbee that he had his audience interested now. The old man was stroking his scraggly white beard, his lips pursed thoughtfully.

But again it was Lesbee who broke the gathering silence:

"I have studied the reports of the methods used to re-establish communication with the Centaurians. The methods all seem too timid, considered in retrospect. There was no bold determination on your part to force attention from them, and although you spent months longer than your original intention cruising around, your lack of initiative made that merely a waste of time.

"It was obvious even then that there is a chlorine-breathing interstellar civilization, somewhat superior to that of Earth. Now, here is a sulphur breathing world."

He leaned forward, in a sudden intensity: "We must make ourselves so obnoxious to these people that they will give us all the information we want. Are you interested?"

The old man stirred. Slowly he straightened his long body. His eyes narrowed to slits of blue.

"Just what have you got in mind," he asked, "besides murder?"

The atomic bomb that was fired into the atmosphere of Sirius I attained a velocity of thirty miles a second. And so, in spite of the violently exploding energy flares that soared up to meet it, it penetrated to within forty miles of the planet's dimly seen surface before it was finally exploded by a direct hit.

In one hour, when the entire scene was still concealed by an impenetrable cloud, they had their first reaction.

A transparent, glittering shell not more than eight feet in diameter was detected by the shadow telescopes. There was something inside it, but whatever it was refused to resolve into focus.

It came nearer and nearer, and still the thing inside would not show clearly to their straining eyes.

Lesbee III stood on the bridge beside the chair in which his grandfather sat. And the sweat broke out on his brow. When the shell

was two hundred yards distant, he said:

"Do you think we ought to let it come any nearer?"

The old man's glance was contemptuous. "Our screens are up, aren't they? If it's a bomb, it can't touch us."

Lesbee III was silent. He did not share the old man's confidence that Earth's science was equal to anything that might happen in space. He was prepared to admit that he knew very little about Earth's science, but still—that shell.

"It seems to have stopped, sir." That was Carson, pointedly addressing the aged captain, ignoring the acting captain.

The words relieved Lesbee III, but the first officer's action saddened him. What kind of suicidal impulse made Carson think that the temporary presence of the hundred-year-old retired captain was a good reason for insulting the man who would be commander for thirty years more at least?

He forgot that, for the thing in the shell, whatever it was, was watching them intently. Lesbee III felt a hideous thrill. He said jumpily:

"Somebody get us a clear picture of it."

The screen blurred, then cleared, but the object in the shell looked as confusing as ever. After a moment longer it moved in an unhuman fashion. Instantly the shell began to approach the spaceship again with a disturbingly steady forward movement.

Within seconds, it was less than a hundred yards away, and coming nearer.

"He'll never get through the defenses!" Lesbee said doubtfully.

He watched the shell with a gathering tenseness. Not once did it slow. At twenty-five yards, it was already through the outer defenses not only of the ship but of Lesbee's sanity.

He couldn't see it. That was the damnable, mind-destroying part. His eyes kept twisting, as if his brain would not accept the image. The sensation was fantastic. His courage slipped from him like a rotted rag. He made a dive for the stairway, and was vaguely amazed to find Carson there ahead of him. He felt the burly Browne crowding his heels.

Lesbee III's final memory of the bridge was of the ancient Captain Lesbee sitting stiffly in the great captain's chair—and the alien shell only a few feet from the outer hull.

They found his grandfather an hour later, still alive but quite mad, and stone blind. As they carried him down the steps to his room, Lesbee heard the old man muttering away to himself. He strained, and a few words came through:

"... We forgot the eccentric orbit of Canis Major A with its B. We forgot that B is one of the strange suns of the Galaxy . . . so heavy, so monstrously heavy—*it* came originally from a planet of B—"

In the cabin, Lesbee had his first

good look at the lined and bearded face. He was shocked. The eyes were all wrong, twisted, crossed, as if they had tried to look at something that could not be seen by human eyes. As he watched they continued to twist, sightlessly, horribly.

Captain James Lesbee, first commander of the *Centaurus II*, died in the sleep hour that same sidereal day, seventy-seven years, four months and nine days out from Earth, at the honorable age of one hundred and six years.

Within six months, no man or woman of his generation remained alive.

It was then that Lesbee III made a major error. He attempted to carry out his purpose of getting rid of a no longer wanted Atkins.

The death of Lesbee III at the hands of Atkins—who was immediately executed despite his plea of self-defense—created a new crisis aboard the *Centaurus II*.

James Lesbee IV was only ten years old, and, though it was urged by Browne that he be made captain at once, First Officer Carson thought otherwise.

"It is true," he said sanctimoniously, "that he will be grown up by the time we reach Procyon, but in the meantime we will establish a Captain's Council to command for him."

In this he was supported by Second Officer Luthers. And several weeks went by before Browne discovered the two wives of Lesbee III were now living with Carson and Luthers.

"You old goats!" he said, at the next meeting of the Captain's Council, "I demand an immediate election. And if you don't agree right now, I'm going to the scientists and the crew."

He stood up, and towered over the smaller men. The older men shrank back, and then Carson made the mistake of trying to draw a blaster from an inside pocket. When he was in a hurry Browne did not know his own strength. He grabbed the two men, and bumped their heads together. The power of that bump was too much for human bone and flesh, particularly since Browne's rage did not permit him to stop immediately.

The developing limpness of the two bodies in his grasp finally brought him out of his passion. When full realization penetrated, he called the scientists into session, and it was then decided to hold an election.

It required a while to make the people understand what was wanted, but finally an executive council was duly elected by secret ballot. And this council recognized the right of James Lesbee IV to succeed his father when he reached maturity. In the meantime the council offered the temporary captaincy to Browne, for a term of one year.

By the following year two of the council members had thought over the situation, and offered themselves as candidates for the captaincy. Browne was re-elected.

The former third officer was

vaguely annoyed at the opposition that had developed against him.

"Why," he said in a hurt tone to his eldest son, "they don't know anything about the duties of an officer."

He began to train his two sons in the details of the work.

"You might as well know something about it," he said. "Somebody's got to."

For a while his conscience bothered him, and then he began to hear that there was a campaign of vilification being carried on against him behind his back.

"Things never used to be like this," he complained to the council. "When donkeys like young Kesser and that middle-aged goat Plauck can call you a fool behind your back, there's something wrong. I think maybe next year you fellows had better appoint me captain until Lesbee is twenty-five years old, and end that kind of nonsense. We can't take the chance of some nut getting control, now that we're burning the inside of the ship in the fuel chambers."

Councillor Plauck commented dryly that the selection of decorations to be used for fuel was a function which the science department shared with the ship's officers. A knowledge of physics was a handy adjunct to any commander in a space cluttered with dangerous energies such as the cosmic rays.

Browne's "recommendation," as it was called, was refused. But he was re-appointed to the captaincy for another year.

It was shortly after this that one of the councillors, passing through the hydroponic gardens, saw a familiar face among the workers. He reported to the council, and an emergency meeting was called. Browne was suave.

"Why shouldn't young Lesbee limber up his muscles a little? This idea of a separate heirarchy is all wrong. In my opinion, all the young people should work in the gardens for a time every year. I'm going to have that put to a vote. I'll bet the regular garden workers would just love to have you big shots come around and tell them that there are people aboard this ship who are too good to do manual labor."

Later, when he was asked about the progress of young Lesbee in his officer training, Browne shook his head, troubled.

"Frankly, gentlemen, it ain't so wonderful. I have him come up to the bridge every day after he's through at the gardens. And he just doesn't seem to take any interest. I'm coming to the conclusion, reluctantly, that he just isn't very bright. He just can't learn good."

It was clear to some of the council members at least, that Captain Browne was learning very "good" indeed.

James Lesbee IV did not pause in his picking of the ripened fruit. The nearest horizon of the hydroponic gardens was two hundred yards away, but his caution was boundless. He listened with a deliberate casualness as the girl spoke to him:

"Mother says the sparks started two days ago. So we must be near Procyon."

Lesbee IV said nothing. He accepted the old explanation for the spark phenomena, that they occurred wherever there were two or more suns to draw huge masses of gases from one another's atmospheres. He had given the girl her instructions the "night" before. It was now up to her to make her report. His fingers continued their automatic movements, as she went on:

"The others think you should run in this election. Browne is putting his oldest son up for the council. If we can elect you in his place—"

She stopped; then: "Remember, you're now twenty-nine years old. And the council still has paid no attention to your rights. You'll have to fight for them."

Lesbee IV made no answer. He felt a weariness at these stupid people who were always urging him to come out into the open. Didn't they realize the danger? And, besides, it was important to wait till they had been to Procyon. Then, with Earth as the next destination, the scoundrels who had cheated him out of his rights would begin to think twice.

"If you don't act," said the girl anxiously, "the men are going to take things into their own hands. They're tired—we're all tired—of doing all the hard work, and getting the poorest food. Gourdy says"—she paused—"we'll take the ship."

She sounded awed. And for the first time Lesbee made a movement that had nothing to do with fruit picking. "Aaaaaa!" he said, and brought his hand down, contemptuously. These ignorant fools, he thought. They didn't realize what they were talking about.

Take the ship indeed—a bunch of working people, who had never even seen space, except on a screen.

"You'd better hurry!" said the girl. "You'd better hurry and make up your mind—"

The vague reports of the underground resurrection that was developing failed to disturb Captain Browne.

"Those dirty beggars," he said to Lieutenant George Browne, his younger son, and chief officer of the ship, "haven't enough brains to lick my boots."

He shrugged. "Besides, just wait till they find out what my plans are when we get into the Procyon system. That'll make them think twice."

The younger Browne said nothing. He considered his old man a fool, and it had already struck him that it would be a long, long time before this burly captain-father of his would start to decline physically.

At seventy-nine, the commander looked good for another twenty years.

It was a long time to wait for the captaincy. He'd be an old man himself before it happened.

The subject was one which he had already discussed with his

elder brother, who was due to run for the council at the elections next month.

Perhaps, he should also let the underground group become aware of the tenor of his thoughts. A few vague promises—

Procyon A with six times the luminosity of Sol swam in the darkness ahead. A yellow-white sun, it loomed larger and larger, brighter and brighter. In the blackness billions of miles to one side, Procyon B was a pale husk of a sun, clearly visible only in the telescopes.

Surprisingly, Procyon sported more planets than had the brilliant, the massively bright Sirius. Twenty-five huge worlds revealed themselves to the radaric eyes of the telescopes. The ship investigated the two with diameters of twenty-five thousand miles.

"Those other fellows had good ideas," said Captain Browne, "but they never gave these alien civilizations credit for good will. The thing we've got to remember is, not once have the inhabitants of these systems made any attempt to harm us. You may say, what about old Captain Lesbee? Nonsense, I say. He looked at something that wasn't

for human eyes, and it wrecked his brain, and he died. The important thing is, that thing in the shell that looked in at him had the ship completely at its mercy, and it made no effort to do damage.

"O.K.!" Big, old Browne looked around the council room. "Where does that leave us? In the best position we've ever been in. Old man Lesbee didn't dare to force issues at Centaurus, because he was dealing with the unknown. At Sirius we got scared and beat it, because the unknown showed itself to be absolutely and completely unhuman. But now we know. There are several big interstellar civilizations here, and they can tell us what we want to know. What do we want to know? Why, which stars have Earth-sized planets with oxygen atmospheres.

"They don't care if we find 'em. Why should they? Oxygen planets are forever beyond their reach, just as sulphur and chlorine planets are beyond ours.

"O.K., then, let's tell 'em what we want to know. How?" He grinned triumphantly at his audience. "Just leave it to me," he said. "Just leave it to me. The first of their ships we can get near will find out."

Actually, it was the fourth ship that found out. The first three paid the *Centaurus II* no attention. The fourth one came to a full stop in the space of a score of miles. It came back to within a hundred yards of the *Centaurus II*, and remained quiet throughout the whole show that Browne put on.

The show was simple enough. He rigged a huge motion picture screen onto one of the lifeboats, then sent the lifeboat outside. The projector was mounted inside the bridge, and the series of pictures that followed showed the *Centaurus II* leaving Earth, arriving first at Alpha Centaurus, then at Sirius, and the discovery that the inhabited planets were based on chlorine and sulphur atmospheres respectively. This was shown by the simple method of projecting beside the planets pictures of the atomic structures of chlorine and sulphur. Earth was pictured with oxygen.

Then began the most important phase of the weird showing. A star map was flashed onto the screen. It pictured sixty-odd suns within twenty light-years of Sol. Onto this scene was imposed a triumvirate of atomic structures—chlorine, oxygen, sulphur. The trio was jerked in front of one sun, held for a moment, then moved on to another.

"Let's see," said Browne, "how quick they catch on that we don't know what kind of atmospheres the planets of those stars have."

They caught on as the camera was moving its three-headed question mark from the sixth to the seventh star. They acted by blotting out the moving trio. Onto the stationary map they imposed a solid rank of atomic structures, one beside each sun.

Browne counted four that were shown as having oxygen atmospheres. They were all on the

other side of the sun from Sirius and Procyon. As he watched, another star map was synchronized with the Earth one, on a vaster scale. It showed thousands of suns, and beside each one was the revealing atomic symbol that indicated the nature of the atmospheres of the habitable planets.

It showed something else, a red triangle extending up from one of the stars about forty light-years from Sol and Procyon. The base of the triangle was an arc that joined the two suns. Along this arc a spaceshiplike object was shown as moving from Procyon to Sol.

There was a curious by-play in connection with the movement. A small object moved three and a fraction times around Sol while the spaceship made the journey.

Plauck gasped: "They're trying to tell us that we can get to Earth in three and a half years if we get into the orbit of . . . of—"

He sat down heavily. Browne stared at him curiously. He was elated that the mission was accomplished, but he could not quite decide about the swift journey to Earth. The prospect of being shorn of his power in such a short time depressed him, particularly as the authorities might frown upon his possession of three young wives, and might even ask questions about his methods of remaining in power.

He saw that the alien ship was already a mile away, and its image on the screen moved off more and more swiftly. It was obviously time to go home.

"Get the lifeboat in," Browne said. "I guess we'd better get started."

He did not know until a few minutes later that Gourdy had timed the revolution to catch the officers and scientists on the bridge.

Gourdy was twenty-four when he led the revolt that overthrew the elected power group on the ship. He was a thick-built, small man with very black eyes, and his father had been a member of the fertilizer crew, attached to the garden squads. And his father before him. And *his* father.

To Gourdy the ship was an enormous vaulting shape, the walls and ceilings of which curved past sections of torn floors. He had been told that once the floors had stretched solidly from one wall of the ship to the other, but this seemed fantastic.

During his lifetime he had watched the lines of the floors withdraw to narrower and narrower confines, and he had even helped in the task of transporting the dismantled sections to the drive chambers. But even with that memory he could not build up inside himself a mental picture of what the ship had once been like.

He remembered sleeping in dormitories with ceilings hundreds of feet high, and the beds packed in rows. The suggestion that the original crew and officers had possessed a separate bedroom

merely irritated him. It was "old man's talk." Nonsense. And besides it didn't matter anyway.

It was the present that counted.

He entered the captain's cabin with wide, curious black eyes. And, because everything was devastatingly new, he took nothing for granted. What was visible to his wondering gaze merely served as an inducement to explore what was not visible.

Thus, in raising the metal floor, to see what was underneath, he discovered the detectaphone system, which had not been used since the days of Captain Lesbee I.

It did not require any particular astuteness to realize how valuable it would be in overhearing and keeping a careful ear on the thoughts of his supporters.

That was really the simplest part of his newly assumed position. Slowly, as the days passed, the problem of running the ship loomed larger and larger. The rebels in their passion of hate had murdered every scientist and officer aboard. Just who was going to operate the ship: Lesbee IV?

Gourdy scowled over the difficulties involved in arriving at some method of working with Lesbee IV.

He had Lesbee brought to him in the captain's cabin. (After the day of the killing, he had not dared to go alone up to the bridge.) He sat in his garden dungarees as Lesbee was brought in. He gazed at Lesbee with bleak eyes, his face unsmiling and hostile.

The conversation that followed was carried on in the spirit of "You-will-either-help-us-or-you-will-be-killed." The crew—"of which I am a member"—would know soon enough whether Lesbee was doing things properly. The results would speak for themselves.

He assumed cowardice on the part of Lesbee. All his life, it seemed to Gourdy, he had watched the other man become more cautious, more abject in his outlook on life.

"He tried to put a good face on it," he said to his particular cronies after the interview, "but he'll work—for the good of the ship. Not that I think he knows very much. That old scoundrel Browne saw to that. But he knows something."

Which was more than could be said for Gourdy, or anybody else aboard the *Centaurus II*.

The great ship ran the length of the Procyon system on its automatic steering gear, then was slowly, uncertainly, pointed in the direction of Sol by a young man who knew "something."

After about three weeks of actually operating the instruments, as distinct from having their operation blurrily explained to him when he was too tired to think, he began to edge the array of accelerators fractionally forward, making a rhythm out of the process, moving each lever of the series before starting again with lever number one.

From the great captain's chair on the bridge, Gourdy watched

anxiously. That was at the beginning. As the days passed, and nothing disastrous happened, his confidence returned.

The realization came that the ship was indestructible. Nothing that men could do mattered to a machine that had been built to survive generations of human beings. He dreamed about the ship in his sleep hour. He had visions of it hurtling through blackness at thousands of miles a second now, and it seemed to him wonderful beyond all his previous emotions.

The first conviction that came to him finally was a commonplace enough revelation: The ship was more important than the human beings in it.

He began to resent the destruction of the interior of the ship for fuel.

He sought and found fuel materials the absence of which would be less noticeable.

His black eyes snapped at people who tossed food scraps on the floor after meals, and at the end of four months he issued his first decree:

"Carelessness and dirty habits will not be tolerated. The ship is the property of those aboard, and individuals who do not do their share of looking after it are insulting the group. Severe penalties will be invoked if this situation does not change immediately."

They were about a year out from Procyon, when Lesbee IV brought a strange fact to the attention of captain, the protector, Gourdy.

In a single twelve-month period the *Centaurus II* had covered more than one third of the distance to Sol. In one year the ship had gone more than three light-years, which would formerly have required twenty years.

"Of course," said Lesbee IV, "I may be wrong, but just look at the star maps of a year ago and of today."

Gourdy looked. The blur of lights interested him, and he listened with an air of thoughtfulness as the other man explained the shift of the stars, and pointed out how great the shift had been. The distance on the maps looked infinitesimally small to Gourdy, but he only smiled and nodded, when Lesbee had finished; and it was not until several days later that he said:

"But, of course, your little scheme will not succeed."

"Eh?" Lesbee was startled.

"I suppose you thought you could frighten me into handing over the captaincy to you, for fear of what might happen to me once we got back to Earth."

Lesbee flushed, and not only because he was startled by the other's reaction. The thought *had* occurred to him that these fools would be wise to give back the command to the rightful commander, now that Earth was so much nearer.

Until this moment he hadn't actually thought of the fact of their speed being doubted. The

potentialities of such disbelief stunned him.

"But I'm not trying to fool you!" he gasped.

Gourdy was chuckling, his eyes bleak. "So you thought I was an idiot, who would fall for a simple story like that." He was almost beside himself with fury, but his voice remained cold. "My friend," he said, "since you were smart enough to, uh, discover this discrepancy, will you explain to me how it happens that we are now traveling at three times the speed of light?"

Lesbee hesitated. At such moments as this, his shame that he, the son, grandson and great-grandson of a captain had sunk so low was almost unbearable. He shrank a little from the look in the black, glaring eyes of Gourdy. He said uneasily:

"I've looked through the books on astronomy, and there is one thing—it is possible we have accelerated ourselves into the planetary orbit of some remote and huge sun; Arcturus is my guess. The fact that there are other suns much nearer doesn't matter. It has been established that, once a body in space attains an orbital relationship with a sun, it requires very powerful forces to upset the relationship."

He shrugged. "We're traveling at the speed that might be expected at the outer rim of a wheel thirty-four light-years in radius."

He broke off: "You can't escape facts—captain. In another year we'll have to start giving serious thought to slowing down the ship. Or else we'll shoot right past the Sun."

Gourdy dreamed of the tremendous machine darting through the Earth system and out into the infinite distances beyond, and again and again woke up perspiring with fear and with a terrible excitement. He began to visit the astronomical room secretly, and operate the shadow telescopes. For hours, he would gaze at the image of the Sun, and it seemed to his imagination that it was growing larger and brighter by the minute.

Except for brief visits to the bridge to spy on Lesbee, and the unobtrusive trips to the telescopes, he seldom left the captain's cabin. He lay on the great blue and silver bed half a day at a time, the earphones of the detectaphone clamped over his ears, tuning into different parts of the ship. And, always, he hoped there would be no talk against him.

But there was, more and more. The gossip of the women, the plain talk of the men. Even his two cronies, who, for what seemed to Gourdy obvious reasons, he had had forbidden access to the captain's cabin, ranted against him.

The words of Lesbee IV fell on ears that listened eagerly, but fearfully. Was it possible, people asked themselves doubtfully, if Earth was really only two years away?

"We'll have to kill that madman!"

Madman, wondered Gourdy. *Why, they must mean me.* He felt furious. *The fools! Couldn't they see the game that Lesbee was playing—trying to re-establish rule of the ship by divine right.*

What right had he to rule the ship? After four generations, the regulations of the Space Board meant nothing—But they'll hang me! Gourdy thought in agony. *And I was only working for the good of the ship.*

They had no right, Browne and those others, no right to make four generations of Gourdys handle fertilizer.

I'd rather see the ship go on forever than have that kind of injustice triumph.

He would have to kill Lesbee. He saw that with a sudden simple clarity. Lesbee was the nub of the problem. That was obvious. Kill Lesbee, and the opposition would die of itself. It seemed a reasonable hypothesis, he told himself with a smiling thoughtfulness.

The idea of death danger from Gourdy was not new to Lesbee. The quality of caution that was in him created such fears before they existed, and fed on a thousand incidents that were without meaning as well as a thousand incidents that showed the true character of the other.

Unlike the groups in the dormitories, he did not think of Gourdy as insane. There was too much of himself in the man; and, besides, during those first ten years of his childhood he had acquired some of his father's outlook on life. It was not conscious; he was not aware of its origin. And for years and years it was hidden under a frustration of easy alarms. But, gradually, as the first year under Captain Gourdy left him freer than at any previous period in his life, he began to think braver thoughts.

Alone on the bridge, he gazed into infinity; and the vastness of the firmament, and something of his own smallness, grew upon him.

It was impossible for such thoughts to dim his sense of caution.

He rigged up a warning device, whereby a light would blink on when somebody started to climb the stairway that led to the bridge. He always, very carefully, switched it off when he went off duty.

A similar electronic device connected to an alarm buzzer protected him when he slept.

There was never a moment when he did not have a blaster on his person. Gourdy, climbing up to the bridge to murder him, died literally without knowing that his purpose was suspected.

It was about a week after Gourdy's body was consumed by the drive converters that the first woman came to Lesbee, complaining of a swelling in her neck.

Lesbee touched the flesh gingerly, then gazed at the pale face of the woman, a garden worker named Keena. It was something of a shock to realize that he was now

guardian of the ship in all its aspects.

"Does it hurt?" he asked.

There was a vague stinging sensation, it seemed. The swelling tingled steadily.

When she had gone, Lesbee pored through medical books on space sickness. It did not take long to discover what related to apparent glandular or other swelling: ". . . It is not actually a swelling in any normal sense. The presence of cosmic rays causes a meson 'pile' swelling in the affected areas. The swelling is a source of atomic energy on a very tiny scale, and there is a continuous sensation of heat— Death usually occurs within twenty-four hours. . ."

Lesbee read the account, his face as white as a sheet.

". . . The presence of cosmic rays, if discovered aboard a spaceship, is usually due to some leak in the defenses of the ship. This should be rectified *without delay*. Once set in motion, a meson pile chain reaction can consume a spaceship . . ."

Lesbee stumbled to his feet, staggered into a protective suit, and rushed to the instrument room, snatched up a detector. He had no doubt as to where he must look. For months Gourdy had been tearing down obscure inner walling for the drive converters. He found a dozen areas where the vital insulation had been removed.

He marked them off, then, still vague as to his next move, he headed down to the machine shops. The place had been stripped, all loose materials, including shielding, removed.

Lesbee raced back to the captain's library, and found a book describing the ship itself. It was a fifteen hundred page volume, and it had endless maps and drawings of the structure of the *Centaurus II*. There were five chapters on the shielding, and, finally, what he wanted, a subheading titled "EMERGENCY DISASTER MEASURES."

". . . Set out screens to power level five. (Note: Such a screen is dangerous to the ship in that the screen itself releases gamma and beta rays sufficient to penetrate the outer walls . . ."

Down in the engine room, Lesbee studied the instrument board controlling the screens. Fortunately, his flimsy knowledge was sufficient. Everything was clearly marked. He shoved the levers over to the figure five, then settled down in a chair to read the next paragraph.

". . . If the temperatures in the affected areas continue to rise after screens or other shielding have been interposed, then it must be assumed that the meson pile has established itself. The affected areas must then be shielded off, and the ship should head for the nearest emergency port. If the ship is far from port, those aboard should set their automatic warning broadcasters to full power, and in the final issue put the ship under automatic control. Suicide is suggested

in preference to death as a living meson pile . . ."

REPORT ON *CENTAURUS II*

. . . the ship was found drifting near the Sun. . . . The last survivor Captain Lesbee IV . . . was found wearing all available protective suits, but the meson pile that was his body had reduced it to a shapeless mass.

Captain Lesbee apparently lived long enough to reverse the engines, and so he succeeded in breaking the ship out of its high-speed orbit. He also left behind him a fairly detailed account of his period as captain.

He took it for granted that the mission of the *Centaurus II* was accomplished. He refers to extensive film records . . . unfortunately, the film room and the adjoining records department had been transformed into a meson pile.

No other clue or record of the mission was found aboard.

It can only be conjectured what precautions can be taken on future expeditions, to prevent the conflicts which destroyed the ship. Apparently, every type of "government" failed once the connection with Earth grew too vague. The relentless environment of space prevented the kind of recovery from error that would have occurred in the milder climates of Earth.

As a result of man's inability to rule himself, nearly two hundred years after the invention of the interstellar drive, he still has no knowledge of his nearest neighbors in space.

This knowledge has become vital for the expansion of civilization.

THE END.

TWO BOOKS

ROCKETS AND SPACE TRAVEL, *by Willy Ley.*

An enlarged, and revised edition of his earlier book, "Rockets," this Willy Ley book puts considerably more emphasis on the space-travel possibilities, both as to engineering possibilities and as to the scientific value of such work.

Much of the material that was previously sequestered in folders labeled "SECRET" is now available, and appears; much previously unavailable data on Peenemunde, released with the aid of the Allied Armies, has been included.

More than a simple second edition, "Rockets and Space Travel" is a companion and supplement to "Rockets."

It's available from your local bookstores, or from Viking Press, Inc., 18 E. 48th St., N. Y. 17. The price is $3.75. If your local bookstore doesn't have it, they can get it for you, but please don't write us!

THE ATOMIC STORY, *by John W. Campbell, Jr.*

Delayed by paper and press shortages, this book originally scheduled for January is now available. It is an effort to integrate the Manhattan Project's achievement with the whole stream of research into physics—to explain the atomic pile and atomic bomb not only as to how they work, but as to where they fit into the whole scheme of knowledge of the universe. And to try for some understanding as to their place in our society, both militarily and economically. It's intended for the general, nontechnician reader.

You can find it through your local bookstores, or get it from Henry Holt & Co., 257 Fourth Ave., New York 3, New York.

BY CHAN DAVIS

LETTER TO ELLEN

The gentleman had a problem. Most men have trouble framing the question to The Girl; he had a harder job —and she would have a still harder decision to make—

Illustrated by Cartier

Dear Ellen,

By the time you get this you'll be wondering why I didn't call. It'll be the first time I've missed in —how long?—two months? A long two months it's been, and, for me, a very important two months.

I'm not going to call, and I'm not going to see you. Maybe I'm a coward writing this letter, but you can judge that when you've finished it. Judge that, and other things.

Let's see. I'd better begin at the beginning and tell the whole story right through. Do you remember my friend Roy Wisner? He came to work in the lab the same time I did, in the spring of '16, and he was still around when I first met you. Even if you never met him, you may have seen him; he was the tall blond guy with the stooped shoulders, working in the same branch with me.

Roy and I grew up together. He

was my best friend as a kid, back almost as far as I can remember, back at the State Orphanage outside of Stockton. We went to different high schools, but when I got to Iowa U. there was Roy. Just to make the coincidence complete, he'd decided to be a biochemist too, and we took mostly the same courses all the way through. Both worked with Dietz while we were getting our doctorates, and Dietz got us identical jobs with Hartwell at the Pierne Labs here in Denver.

I've told you about that first day at the lab. We'd both heard from Dietz that the Pierne Labs were devoted, now, almost entirely to life-synthesis, and we'd both hoped to get in on that part of the work. What we hadn't realized was quite how far the work had got. I can tell you, the little talk old Hartwell gave us when he took us around to show us the lay of the land, was just as inspiring as he meant it to be.

He showed us the wing where they're experimenting with the synthesis of new types of Celenterates. We'd heard of that, too, but seeing it was another thing. I remember particularly a rather ghastly green thing that floated in a small tank and occasionally sucked pieces of sea moss into what was half mouth, half sucker. Hartwell said, offhand, "Doesn't look much like the original, does it? That one was a mistake; something went wrong with the gene synthesis. But it turned out to be viable, so the fellows kept it around. Wouldn't be surprised if it could outsurvive some of its natural cousins, if we were to give it a mate and turn it loose." He looked at the thing benignly. "I sort of like it."

Then we went down to Hartwell's branch, Branch 26, where we were to work. Hartwell slid back the narrow metal door and led the way into one of the labs. We started to follow him, but we hadn't gone more than three steps inside when we just stood still and gawked. I'd seen complicated apparatus before, but that place had anything at the Iowa labs beat by a factor one thousand. All the gear on one whole side of the lab —and it was a good-sized place— was black-coated against the light and other stray radiation in the room. I recognized most of the flasks and fractionating columns as air-tight jobs. A good deal of the hookup was hidden from us, being under Gardner hoods, air-tight, temperature-controlled, radiation-controlled, and everything-else-controlled. What heaters we could see were never burners, always infrared banks.

This was precision work. It had to be, because, as you know, Branch 26 synthesizes chordate genes.

Roy and I went over to take a closer look at some of the gear. We stopped about a meter away; meddling was distinctly not in order. The item we were looking at was what would be called, in a large-scale process, a reaction vat.

It was a small, opaque-coated flask, and it was being revolved slowly by a mechanical agitator, to swirl the liquids inside. As we stood there we could barely feel the gentle and precise flow of heat from the infrared heaters banked around it. We watched it, fascinated.

Hartwell snapped us out of it. "The work here," he said dryly, "is carried out with a good deal of care. You've had some experience with full microanalysis, Dietz tells me."

"A little," I nodded, with very appropriate modesty.

"Well, this is microsynthesis, and microsynthesis with a vengeance. Remember, our problem here is on an entirely different level even from ordinary protein synthesis." (It staggered her a little to hear him refer to protein synthesis as ordinary!) "There, you're essentially building up a periodic crystal, one in which the atoms are arranged in regularly recurrent patterns. This recursion, this periodicity, makes the structure of the molecule relatively simple; correspondingly, it simplifies the synthesis. In a gene, a virus, or any other of the complex proteinlike molecules, there isn't any such frequent recursion. Instead, the radicles in your molecule chain are a little different each time; the pattern almost repeats, but not quite. You've got what you call an aperiodic crystal.

"When we synthesize such a crystal, we've got to get all the little variations from the pattern just right, because it's those variations which give the structure enough complexity to be living."

He had some chromosome charts under his arm, and now he pulled one out to show to us. I don't know if you've ever seen the things; one of them alone fills a little booklet, in very condensed notation. Roy and I thumbed through one, recognizing a good many of the shorthand symbols but not understanding the scheme of the thing at all. When we got through we were pretty thoroughly awed.

Hartwell smiled. "You'll catch on, don't worry. The first few months, while you're studying up, you'll be my lab assistants. You won't be on your own until you've got the process down pretty near pat." And were we glad to hear that!

Roy and I got an apartment on the outside of town; I didn't have my copter then, so we had to be pretty close. It was a good place, though only one wall and the roof could be made transparent. We missed the morning sun that way, but I liked it all right. Downstairs lived Graham, our landlord, an old bachelor who spent most of his time on home photography, both movie wires and old-fashioned chemical prints. He got some candid angle shots of us that were so weird Roy was thinking of breaking his cameras.

At the lab, we caught on fast enough. Roy was always a pretty bright boy, and I manage to keep up. After a reasonable period Hartwell began to ease himself out

of our routine, until before we knew it we were running the show ourselves. Naturally, being just out of school, we began as soon as we got the drift of things to suggest changes in the process. The day Hartwell finally approved one of our bright ideas, we knew we were standing on our own feet. That's when the fun really began.

Some people laugh when I say "that kind of drudgery" is fun, but you're a biochemist yourself and I'm pretty sure you feel the same way. The mere thought that we were putting inert colloids in at one end and getting something out at the other end that was in some strange way *living*—that was enough to take the boredom out of the job, if there'd been any.

Because we always felt that it was in our lab and the others like it that nonlife ended and life began. Sure, before us there was the immense job of protein synthesis and colloid preparation. Sure, after we were through there was the last step, the ultramicrosurgery of putting the nuclear wall together around the chromatin and imbedding the result in a cell. (I always half-envied your branch that job.) But in between there was our stage of the thing, which we thought to be the crucial one.

Certainly it was a tough enough stage. The long, careful reactions, with temperatures regulated down to a hundredth of a degree and reaction time to a tenth of a second; and then the final reactions, with everything inclosed in Gardner hoods, where you build up, bit by bit, the living nucleoplasm around the almost-living chromosomes. Hartwell hadn't lied when he said the work was carried out with care! That was quite a plant for two young squirts like us to be playing around with.

Just to put an edge on it, of course, there was always the possibility that you'd do everything right and still misfire. Anywhere along the line, Heisenberg's Uncertainty Principle could shove a radicle out of place in those protein chains, no matter how careful you were. Then you'd get a weird thing: a gene mutating before it was even completed.

Or, Heisenberg's Principle might pull you through even if your process had gone wrong!

We got curious after a while, Roy especially. Hartwell had told us a lot; one thing he hadn't told us was exactly *what we were making,* fish, flesh, or fowl, and we weren't geneticists enough to know ourselves. It would have been better, while we were working, to have had a mental picture of the frog, or lizard, or chicken that was to be our end product; instead, our mental picture was a composite of the three, and a rather disconcerting composite it made. I preferred to imagine a rabbit, or better yet an Irish terrier puppy.

Hartwell not only hadn't offered to tell us, he didn't tell us when we asked him. "One of the lower chordates," he said; "the species name doesn't matter." That phrase "lower chordates" didn't ring quite

true. There were enough chromosomes in our whatever-they-were's that they had to be something fairly far up the scale.

Roy immediately decided he was going to get the answer if he had to go through twenty books on genetics to do it. Looking back, I'm surprised I didn't have the same ambition. Maybe I was too interested in chess; I was on one of my periodic chess binges at the time. Anyhow, Roy got the genetics books and Roy did the digging.

It didn't take him any time at all. I remember that night well. He had brought home a stack of books from the library and was studying them at the desk in the corner. I was in the armchair with my portable chessboard, analyzing a game I'd lost in the last tournament. As the hours went by, I noticed Roy getting more and more restless; I expected him to come up with the answer any time, but apparently he was rechecking to make sure. About the time I'd found how I should have played to beat Fedruk, Roy got up, a little unsteadily.

"Dirk," he began, then stopped.

"You got it?"

"Dirk, I wonder if you realize just how few chordate species there are which have forty-eight chromosomes."

"Well, humans have, and I guess we're not so unique."

He didn't say anything.

"Hey, do you mean what I think you mean?" I jumped to my feet.

If he did, it was terrific news for me; I think I'd had the idea in the back of my mind all the time and never dared check it for fear I'd be proved wrong. Roy wasn't so happy about it. He said, "Yes, that's exactly what I mean. The species name Hartwell wouldn't tell us was *Homo sapiens.* We're making—robots."

That took a little time to digest. When I'd got it assimilated, I came back, "What do you mean, robots? If we made a puppy that wagged its tail O.K., you'd be just as pleased as I would." (I was still stuck on that Irish terrier idea of mine.) That wouldn't give you the shudders. Why do you get so worried just because it's men we're making?"

"It's not right," he said.

"What?" Roy never having been religious or anything, that sounded strange.

"Well, I take that back, I guess, but—" His voice trailed away; then, more normally, "I don't know, Dirk. I just can't see it. Making humans—what would you call them if not robots?"

"I'd call them men, doggone it, if they turn out right. Of course if they don't turn out right—maybe I could see your point. If they don't turn out right. Killing a freak chicken and killing an experimental baby that didn't quite —succeed—would be two different things. Yeah."

"I hadn't thought of that."

"Then what the heck *were* you thinking of?"

CARTIER

"Aw, I don't know." He went back to the desk, slammed his books shut.

"What's bothering you, Roy?"

He didn't answer, just went into his bedroom and shut the door. He didn't come out again that night.

The next morning he was grim-faced, but you could see he was excited underneath. I knew he was planning something. Finally I wormed it out of him: he was going to take a look around Branch 39 to try and find some human embryos, as confirmation. Branch 39, as you know, is one of the ones that shuts up at night; they don't have to have technicians around twenty-four hours a day as 26 does. Roy's plan was to go up there just before closing time, hide, and get himself locked in overnight.

I asked him why the secrecy, why didn't he just ask to be shown around. "Hartwell doesn't want us to know," he said, "or he would have told us. I'll have to do it on the QT."

That made some sense, but—"Heck, Hartwell couldn't have expected to keep us permanently in the dark about what we were making, when all the dope you needed to figure it out was right there in the library. He must have wanted simply to let us do the figuring ourselves."

"Huh-uh. He knew we could puzzle it through if we wanted, but he wasn't going to help us. You think the lab wants to publicize what they're doing? No, Hartwell must be trying to keep as many people as possible from knowing; he hoped we'd stay uncurious. I'm not going to tell him we've guessed, and don't you."

I agreed reluctantly, but Roy's play-acting seemed to me like just that. Roy was deadly serious about it.

Later, I got the story of that night. He'd gone up to 39 as planned, and hid in the big hall on the second floor; that was the place with the most embryos, and he thought he'd have the best chance there. Everything went O.K.; the assistant turned out the lights and locked up, and Roy stayed curled in his cabinet under a lab table. When the sounds had died down in the corridors outside, he came out and looked around.

He didn't know quite how to start. There were all sizes and shapes of gestators around. When he had taken out his flash and got a good look at one, he remained in as much of a quandary as before. It didn't seem to be anything but a bottle-shaped black container, about twenty centimeters on a side, in the middle of a mass of tubing, gauges, and levers. He could guess the bottle contained the embryo; he could guess the tubing kept up the flow of "body fluids" to and from the bottle; he could recognize some of the gauge markings and some of the auxiliary apparatus; and that was all. Not only was the embryo not exposed to view, but he didn't see any way of exposing it. There was a label, in a code he couldn't read. Nothing was any help.

The gestators were simple enough compared to the stuff he worked with, but he had a healthy respect for that sort of thing and didn't want to experiment to try to figure them out. If you meddled with a gestator in the wrong way, there was the chance that you'd be ruining a hundred people's work; and there would be many more wrong ways than right.

He made the circuit of the lab, stooping over one gestator after another, considering. After a while the moon rose and gave him a little more light. That was not what he needed.

A key turned in the lock.

Roy, hoping he hadn't been seen, ran back to his hiding place. He left the cabinet open far enough so he could see. A figure came in the door, turned to close it, and strode toward the center of the hall. As it passed through a patch of moonlight from one of the windows, Roy recognized the face: Hartwell.

He must have been working late in his office and come down for a look at his branch's products before leaving. Be that as it may, his presence cinched the thing: whatever embryos he looked at would be from our branch. Roy watched breathlessly while the other went from bench to bench, peering at the code labels. Finally he stopped before one, worked a lever, and peeked in through a viewer in the side, which Roy hadn't noticed. He looked quite a while, then turned and left.

I don't need to tell you that Roy didn't lose any time after Hartwell left in taking a look through that same viewer. And I don't need to tell you what he saw.

Reading back over this letter, I can see I'm stretching the story out, telling you things you already know, and things that aren't really necessary. I know why I'm doing it, too—I'm reluctant to get to the end. But what I've got to tell you, I've got to tell you; I'll make the rest as short as I can.

Roy was pretty broken up about the whole thing, and he didn't get over it. I think it was the experience in the gestation lab that did it. If he'd just asked Hartwell for the truth, straight out, the thing would have stopped being fantastic and again become merely his business; but that melodrama up in Branch 39 kept him from looking at things with a clear eye. He went around in a half-daze a good deal of the time, pondering, I suppose, some such philosophical problem as, When is a man not a man? It was all terrible, robots were going to take over the world, or something like that. And he insisted I still not tell Hartwell what he'd learned.

Then came the payoff. It was several weeks later, the day after Roy's twenty-sixth birthday. (The date was significant, as I learned later.) He told me before we left the lab that Hartwell had asked him to come up after work to talk with Koslicki.

I raised my eyebrows. "Koslicki, huh? The top man."

"Yes, Koslicki and Hartwell both."

He looked a little worried, so I ventured a crack. "Guess they've got a really rugged punishment for you, for trespassing that night. Death by drowning in ammonium sulphide, perhaps."

"I don't know why you can't take things seriously."

"Oh? What do you think they want to talk to you about?"

"No, I mean this whole business of—"

"Of making 'robots,' yeah. Roy, I do take it seriously, darn seriously. I think it's the biggest scientific project in the world right now. You take the kind of work we're doing, together with the production of new life forms like those experimental Coelenterates we saw, and you've got the groundwork for a new kind of eugenics that'll put our present systems in the shade. Now, we select from naturally-occurring haploid germ cells to produce our new forms. In the future we'll *make* the new forms.

"We can make new strains of wheat, new species of sheep and cattle—new races of men! We won't have to wait for evolution any more. We won't have to content ourselves with giving evolution an occasional shove, either, we'll be striking out on our own. There's no limit to the possibilities. New, man-made men, stronger than we are, with minds twice as fast and accurate as ours—I take that plenty seriously."

"But they wouldn't be men."

This was beginning to get irritating. "They wouldn't be Homo sapiens, no," I answered. "Let's face it, Roy. If I were to get married, say, and have a kid that was a sharp mutation, a really radical mutation, and if he were to turn out to be a superman—that kid wouldn't be Homo sapiens, either. He wouldn't have the same germ plasm his parents had. Would he be human or wouldn't he?"

"He'd be human."

"Well? Where's the difference?"

"He wouldn't have come out of somebody's reagent bottles, that's the difference. He'd be—natural."

I could take only so much of that. Leaving Roy to go to his conference with Koslicki and Hartwell, I came home.

There, I finished up the figuring on some notes I'd taken that day in the lab, then I turned the ceiling transparent and sat down with my visor. I'd just added a couple of new wires to my movie collection, so I ran them over—a couple of ballets, they were. No, none of the wires I've shown you. I've thrown out all the movies I saw *that* night.

I was sitting there having a good time with the "Pillar of Fire" when Roy came back. He made a little noise fumbling with the door. Then he slid it back and stood on the threshold without entering.

Switching off the visor, I glanced around. "What's the take, Jake?" I corned cheerfully. "Did Kos-

licki give you a good dressing-down? Or did he make you the new director?"

". . . I'll play you a game of chess, Dirk."

This time I took a good look at him. His shoulders were stooped more than usual, and he looked around the room as if he didn't recognize it. Not good. "For crying out loud! What's the story?"

"Let's play chess."

"O.K.," I said. He came in and got out the men and the big board, but his hand shook so I had to set up his men for him. Then, "Go ahead," I told him.

"Oh, yeah, I've got white."

Pawn to king four, knight to king bishop three, pawn to king five—one of our standard openings. I pulled my knight back in the corner and brought out the other one; he pushed his pawns up in the center; I began getting ready to castle.

Then he put his queen on queen four. "You don't mean that," I said. "My knight takes you there."

"Oh, yeah, so he does," Roy said, pulling his queen back—to the wrong square. He was staring over my shoulder as if there was a ghost standing behind me. I looked; there wasn't. I replaced his queen.

Finally, still keeping up the stare, he began, "Dirk, you know Hartwell told me—"

"Yeah?" I said casually. I knew it had been something important. Roy hadn't been *this* bad the last

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few weeks. Whatever it was, he might as well get it off his chest.

Roy, however, seemed to have forgotten he'd spoken. His eyes returned intently to the board. His bishop went to king three—where I could not take it—and the game went on.

"You're going to lose that bishop's pawn, old man," I remarked after a while.

I think that was what triggered it. He said, suddenly but evenly, "I'm one."

"I'm two," I said, apropos of nothing. My mind was still on the game.

"Dirk, *I'm one,*" he insisted. He stood up, upsetting the board, and began to walk up and down. "Koslicki just told me. I'm one of the . . . Dirk, I wasn't born, I'm one of the robots, they put me together out of those chemicals in those white-labeled reagent bottles in that laboratory—"

"What?"

He stopped his pacing and began to laugh. "I'm just a Frankenstein, you can pull out your gun and sizzle me dead, it won't be murder, I'm just a robot." He was laughing all through this and he kept on laughing when he'd stopped.

I figured if he was going to blow up he might as well blow up good and proper. He'd make some noise, but old Graham would be the only one disturbed. "So," I said, "how did you feel going through the reaction vats over in 26? Did the microsurgery hurt when they put you together?" Roy laughed. He laughed harder. Then he screamed.

Deciding that enough was enough, I yelled at him. He screamed again.

"Shut up, Roy!" I shouted, as sharply as I could. "You're as human as I am. You've lived with yourself twenty-six years, you ought to know whether you're human or not."

After the first couple of words he listened to me O.K., so I figured the hysterics were over. I tried to sound firm as I said, "Are you through with the foolishness, now?"

Roy didn't pass out, he simply lay down on the floor. I sat down beside him and began to talk in a low voice. "You're just as good as anybody else; you've already proved that. It doesn't matter where you started, just what you are here and now. So what if you did start out in a lab? The rest of us started out in the ooze on the bottom of some ocean. Which is better? It doesn't make any difference. You're just as good as anybody else." I said it over and over again, as calmly as I could. Don't know whether or not it was the right thing to do, but I had to do something.

Once he raised his head to say, "Roy Wisner, huh? Is that me? Heck no, why didn't they call me Roy W23H? . . . I wonder where they got the name Wisner anyway." He sank back and I took up my spiel again, doing my best to keep my voice level.

After several minutes of this he got up off the floor. "Thanks," he said in a fairly normal tone. "Thanks, Dirk. You're a real friend." He went toward the door, adding as he left, "You're human."

I just sat there. It wasn't till he'd been gone a couple of minutes that I put two and two together. Then I raced out of that room and to the stairs in nothing flat.

Too late. Graham's door was open downstairs, and the light from inside shone into the hall, across the twitching body of Roy Wisner.

Graham looked at me, terrified. "I thought it was all right," he stammered. "He asked me for some hydrocyanic, I knew he was a chemist, I thought it was all right."

Hydrocyanic acid kills fast. One look at the size of the container Roy had drained and I saw there wasn't much we could do. We did it, all right, but it wasn't enough. He died while we were still forcing emetic down his throat.

That's about all, Ellen. You know now why I never spoke much to you about Roy Wisner. And you've probably guessed why I'm writing this.

Roy was one of the experiments that failed. He was no more unstable mentally than a great many normally born men; still, a failure, though nobody knew it until he was twenty-six years old. The human organism is a very complex thing, and hard to duplicate. When you try to duplicate it, you're very likely to fail, sometimes in obvious ways and sometimes in ways that don't become apparent till long afterward.

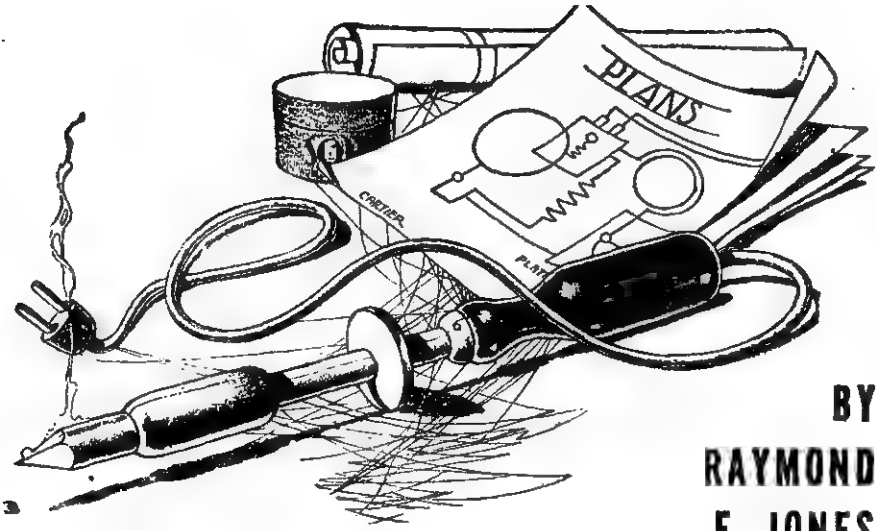
I may turn out to be a failure, too.

You see, I'm twenty-six now, and Koslicki and Hartwell have told me. *I* wasn't born, either. I was made. I am, if you like, a robot.

I had to tell you that, didn't I, Ellen. Before I asked you to marry me.

Dirk

THE END.



BY
RAYMOND
F. JONES

THE MODEL SHOP

Any research outfit has to have an efficient model shop. But the model shop this outfit had suddenly became just a wee bit more than that—

Illustrated by Cartier

Brian Kennely was at once the awe, the idol, and the unadulterated pain in the neck to the junior, assistant, and Project Engineers of Special Developments Lab at North State Electric.

The awe because his brain held more than the combined abilities of most any two of the other Project Engineers plus any three juniors. The idol because he'd take time from his own fantastic Goldbergs to help the lowliest junior with his first resistance coupled amplifier when it howled like a banshee.

And the pain in the neck because whenever a Brian Kennely set of prints went to the model shop all other projects sat on the shelf until the B. K. stuff was done.

This even included the work of Chris Devon, North State's ace engineer, whose specialty was slugging it out with intractable components and circuits that no

one else would tackle, until the impossible was accomplished with them.

In his pain-in-the-neck moments Brian Kennely was whisperingly referred to as the cavalier engineer. When he first came to North State, Millie, the lab secretary, had taken in his pipe and smart Stetson, and natty clothes.

"Just like Don Ameche," she'd said. "I'll bet he invents the telephone before next week, the big cavalier—"

But it was only because he had done and was doing the things that most men dream about but never accomplish. They liked him and respected him for it.

Chris Devon had known him since high school. At college they had met Martha, who had chosen Chris over Brian. Chris had never quite understood why, but he was not one to question miracles.

After college, Chris Devon had gone directly into development engineering, but that had been too tame for Brian Kennely who'd gone to Mongolia and South America for several years of geophysical engineering. He had designed instruments that were revolutionizing the science.

Then, shortly before the war, he switched to communication electronics. At Devon's suggestion he'd joined North State, but had spent most of his time as a field engineer. He had been as good as in the front lines during most of the war.

It was inevitable that their opposite natures combined with life-long acquaintance should result in strong mutual attraction. As a consequence, they had determined to take the step dreamed of by most top-flight engineers but seldom achieved. They planned to open their own consulting office as soon as their kitty grew big enough —and it was growing. They'd soon be ready.

But there was still work to be done for North State. And Devon was two weeks behind on a fairly routine project, a remote weather station. His prints had been in the model shop for three weeks now.

And Kennely's—

He squinted up from his propagation calculations as he saw the familiar pipe laid on the top of the desk next to his.

"Hi, Chris," Kennely's voice boomed. He took off his coat. "Trying to put a forecasting unit in that weather station of yours?"

"How can I put anything in it—when it's still a bunch of paper down in MacIlhenney's files?"

"Aw, don't be hard on Mac. He's got his hands full these days, so many boomers passing through his shop pretending they're mechanics."

"Sure, I'd find excuses for him, too, if my stuff were all finished after only five days."

"You mean he's got my job done? Say, that's nice going! Come on down and let's have a look at it."

"I saw it as I passed the model shop on the way in."

Kennely took Devon's arm and hoisted him out of the chair. "Look, Chris, I'll tell you a secret. Here's how I get Mac on the line. Slip him a couple of these six-bit cigars—"

Devon laughed and gave up. You couldn't do anything else with a guy like Brian Kennely.

They walked down the hall to the model shop as Mac opened up.

"I hear you've got my baby all done," said Kennely.

"You only brought it in Monday," said Mac. "I told you Wednesday."

"Always kidding, eh?" said Kennely to Devon.

"What's that over in the middle of the floor?" asked Devon. "Isn't that—? Mac! You finished *my* model, too!"

The foreman stared across the shop at the two completed models. "Well, I'll be—! The boys must have put on a little extra speed yesterday. I had to leave early in the afternoon, but I didn't expect anything like that!"

They entered the shop and walked around the models.

"I never saw anything quite so pretty come out of this dump," said Kennely. "Who've you got on the wiring, Mac?"

"Same girls you always called solder slingers."

"Promote them to senior solder slingers. Come on, Chris, let's get Dick and Charlie to dolly these things into the lab."

The two engineers went back to their lab benches and began setting up test equipment.

Chris Devon's project was a simple station to be used by the Weather Bureau to collect climatological data in places where no co-operative observers could be obtained.

Brian Kennely's project, as always, was the more spectacular. It was a television remote indicating system for use over long distances or in cases of harmful effects to human observers at close range. It was particularly adaptable to radioactive chemistry.

When the two models were wheeled in, Kennely put the plugs for his transmitter and receiver units into the nearest receptacles and waited for the warm up. In a moment the dial needles began to swing over, and the engineer quickly adjusted the controls. The power supply seemed in order. The amplifiers were functioning properly. He switched in the sample instrument indicators, then the video pickup.

In a moment the receiver screen lighted in a blaze of color. He brought the meters into focus. They shone with the sharpness of a modern four-color print.

"What the devil?" Devon exclaimed. "I didn't know you were doing this in color. That's better stuff than the networks have yet."

"Oh, yes." Kennely's manner was his best cavalier style. "Remote chemistry, for example, would be almost impossible without color. This is not bad—for a first model."

The other engineers gathered around now, gaping at the excellence of the color television. Devon returned to his own prosaic setup. He'd have to get busy and push some of these weather stations out the door before he got cut off at the pockets. Webber, the chief engineer, wasn't happy with the lack of progress on the project, which was budgeted at one hundred thousand dollars with no wartime cost-plus, either.

Devon glanced over the beautifully arranged array of dials and indicators on the viewing panel. He checked the mounting of the scanner tube.

Something was wrong. Then he saw it—so obvious that he'd had to look three times in the same spot before it registered. There was an extra row of instruments on the viewing panel. He stared at them and swore to himself. Why couldn't they follow a blueprint down in the model shop?

What he saw was incomprehensible. On the unscheduled row of meters was the designation: Prognostication.

Groups of dials with variable time scales indicated pressure, temperature, and relative humidity, and precipitation rates.

Brian Kennely came up quietly. "Nice job on yours, too," he said. "Tried it out yet?"

"Some yokel down there is trying to be funny! Look—"

"So you *did* put in a forecast unit! I didn't know."

"Of course not! There isn't any such animal. Somebody's painted a panel and put some dials on it. I can take a joke, but they've loused up the whole layout and Webber wants this stuff by the end of the week."

"*Mine* works," said Kennely, calmly drawing on his pipe.

"What do you mean?"

"Mine has unauthorized additions, too—but keep it under your hat. I don't want these other guys to know about it."

"What are you talking about?"

"The color business for one thing. You know as well as I do that no conventional color circuits could be put into a setup like mine."

Devon stared at his fellow engineer. "You didn't design it?"

"No—but it works. Somebody may be playing jokes, but that somebody can make our best stuff around here look like peanuts. Turn on your gadget. Let's see how it works."

As if doubting Kennely's sanity, Devon plugged in the cords and watched the tubes and meters come to life. He inspected them critically. His Climat Center receiver showed a perfect image of the dials, but it was not colored.

"I guess they figured you didn't need color," said Kennely. "How can we tell if the prognosticator panel is any good?"

"This is ridiculous, Brian! It couldn't possibly work. This thing would indicate exact temperatures, pressures, and so on. A meteorologist would be laughed out of the business if he claimed he could do that."

"But suppose we set the thing to indicate the data for tomorrow at this time and see how well it checks?"

"Great guns, this thing would be worth millions of bucks if it would do what those meters say!"

"Yeah," said Kennely thoughtfully. "But I'm thinking about the guy in the model shop who is responsible for this. He'd be a good guy to offer a full partnership when we open up on our own. Let's go down to the shop. Got those figures on tomorrow's weather?"

Walking towards the model shop again, Chris Devon had the curious feeling that he had stepped off a high precipice during the morning and hadn't quit dropping.

Mac came over as they entered. "Don't tell me," he said. "I know. It isn't any good. We'll have to get out another rush model by Saturday noon. We can't do it, and that's that!"

"We just wanted to compliment you on a fine job," said Kennely.

Mac scratched his head in disbelief. "What do you want, then?"

"Nothing. We want to compliment the ones who worked on our models. Who did it?"

"Parks would know. He's supervisor on them. Parks!"

The supervisor turned. When he saw Kennely he put a hand over his face.

"I'm sorry as heck, Brian, but we just haven't been able to get started on your model. We can't begin work until tomorrow at the earliest. All the parts are on hand, but—"

Mac turned upon him. "Are you crazy? Kennely and Devon both got their models this morning."

"That's impossible! We haven't made them!"

"*Somebody* did," said Kennely. "They're in our lab."

"I don't believe it," said Parks. "Somebody's—"

"Nuts," Mac said.

"Maybe he didn't see it," suggested Devon. "Maybe some of the crew just went ahead—"

"On a project like those two? It would be about as inconspicuous as four elephants doing a ballet in here."

"Well, how about you, Mac? You know which ones would handle it."

"Well, sure—Lessee, now. Myrtle would do the video circuits. No, wait a minute. She was on Peterson's project. Jane—"

The foreman suddenly looked hard at them. "Come to think of it I don't seem to be able to remember a single one that wasn't on something else. But *somebody* built those models—"

"Mind if we just wander around and talk to your people?" said Devon.

By noon they had spoken with every member of the shop crew. Every one denied any part of the work on the two models.

Even Kennely's calm began to waver. "Whoever the genius is around here, he's certainly of a retiring nature. Let's go back and dismantle mine. We ought to leave yours as is until we find out just

how well the prognosticator circuits are working."

"Suits me," said Devon. "But those circuits *can't* work!"

Carefully, they dismantled the model of the remote indicator. As they proceeded, they were filled with admiration for the ingenuity of the circuits disclosed. They were so completely unorthodox that it was as if a mind totally unfamiliar with conventional engineering had designed them. They were *foreign*.

By quitting time they had the color video circuits analyzed and they had encountered a completely new method of achieving color television, one they knew was worth untold amounts commercially.

"There it is," said Kennely as they finished. "Shall we continue our search for the unknown gremlin in our midst or shall we tell Webber we did it and see if the Board of Directors vote us a raise?"

"Why would anybody cook up a thing like this and not come forward to get the medals pinned to his chest?"

"Honestly, I don't know, Chris. This is the biggest, most senseless, and most potent puzzle I've ever seen. But let's call it quits for tonight. We'll see how the meterological forecast for tomorrow makes out."

Devon took the sketches of the circuits home. After dinner that night he spread them out in his study while Kip and Pat, the twin nine-year-olds, hollered from downstairs for him to come and play.

It was like standing stupidly by while someone pointed out the obvious, he thought. He would never in the world have conceived those circuit applications, but once he had seen them in use he knew that they were the simplest means of accomplishing their purposes.

There was one factor that neither he nor Kennely had considered sufficiently. Both the models had required several hundred man hours of work in their construction. Why couldn't they find one person who had contributed? Many must have had a part in it.

Where did Mac fit in? Devon wondered. Surely he must know more than he was admitting.

The next morning, Kennely was already at his desk when Devon entered.

He removed his pipe and looked up. "Shall we check the weather?"

"You check it," said Devon. "I think I'm getting scared of the answer."

"It's not quite time, but maybe it's close enough to interpolate the values. Let's have a look."

They went in and turned Devon's equipment on. The values were markedly different from the ones predicted the day before.

"We'd better wait," said Kennely. "Notice that the temperature readings appear to be of the air *outside* the building instead of inside."

"There's no sensitive element connected outside."

"Let's check on it with some thermometers."

At that moment, Jackson, a Project Engineer, walked by swearing profusely. "You'd think those

dumb solder slingers of Mac's had never seen a blueprint before!" He addressed the air that was sulphurous about his head.

"It's happened again!" said Kennely.

For half an hour they watched the instruments in the weather station. Slowly, the needles approached the values indicated twenty-four hours before on the prognostication panel.

At the exact time Kennely checked his watch.

"Bull's-eye," he announced. The three predicted values of pressure, temperature and relative humidity were right on the nose. It was too much for sheer coincidence.

"Well—any suggestions?" said Kennely, at last.

"Let's go down and look over the model shop again. Maybe we can pick up a clue. There's got to be *some* answer to this crazy thing."

They had barely stepped into the door of the model shop when Mac saw them. He picked up a bar of cold rolled steel from a bench.

"This place is off bounds for engineers!"

"What's the trouble, Mac?" asked Kennely.

"Trouble! That fool Jackson was in this morning. He swore up and down that we don't know a blueprint from the linoleum on the floor. He said we hadn't made his model according to the prints, same as you."

"Well, look, Mac—those models are a lot better than we designed them. We can't figure out who could build them that good. Why do you think no one will admiit working on them?"

"You've got me. As if I didn't have enough trouble trying to build Goldbergs, now I have to put up with screwballs who build stuff and say they never saw it before."

"Well—mind if we walk around some more?"

"You can't make much more trouble than I've already got, I guess."

The two engineers moved into the shop. On their left was Mac's pride, the powerful, new, six thousand dollar brake. A small turret lathe was located farther along, and beside it, a heavy drill press. Other, smaller machine tools were lined up along the wall farther to the left. On the right was the assembly division where rows of girls wired the jobs.

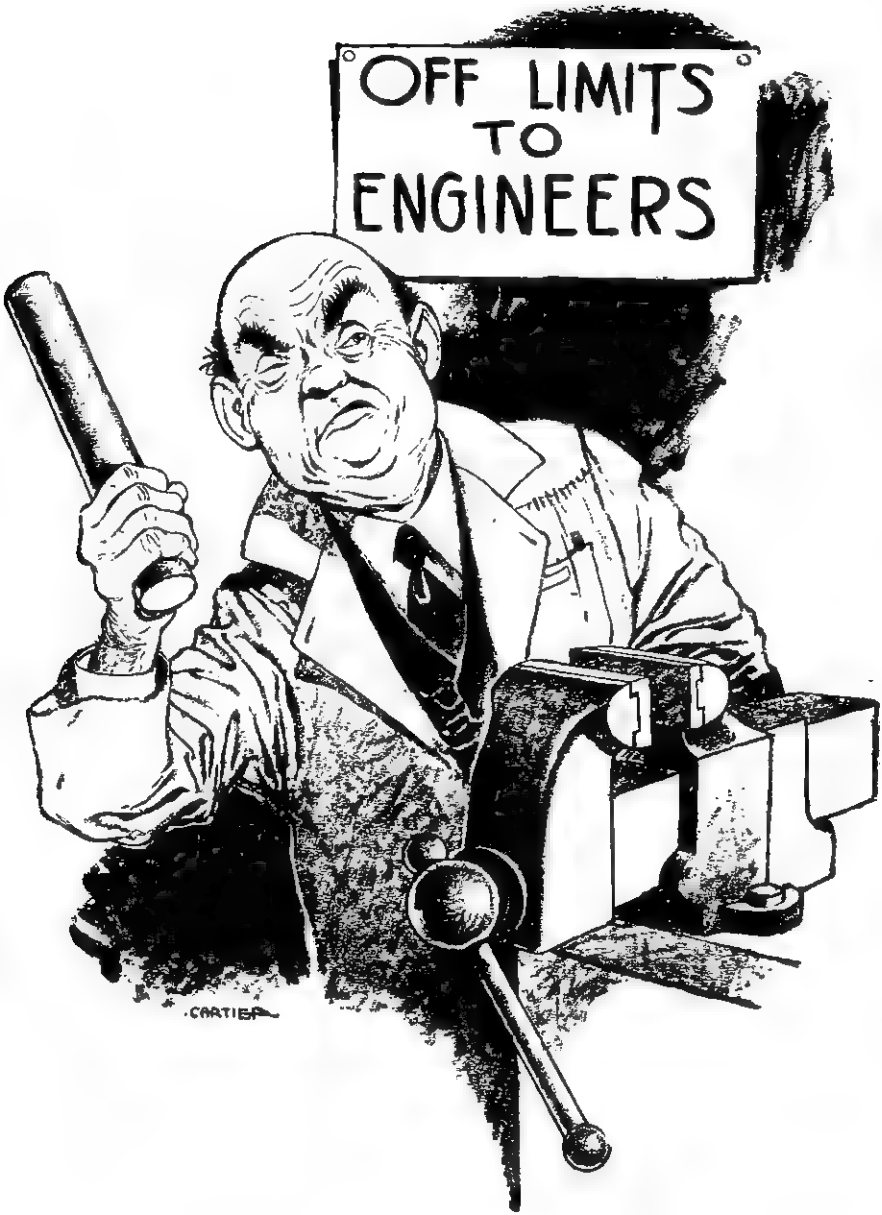
Straight ahead was a materials receiving room. A huge packing crate which formed a cube nearly ten feet on a side dwarfed everything else on the floor of the room.

"Wonder what that gadget is," said Kennely. "Another monster like this brake that gets used about once a week?"

"Mac ought to clean the place up," said Devon. "It looks like bug tracks all over."

"Where? What are you talking about?"

Devon picked up a soldering iron that was plugged in, but lying unused in its holder. "This." His finger pointed to a delicate, silver line that traced its way along the entire length of the cord.


OFF LIMITS
TO
ENGINEERS
CARTIER

"I never saw any bug tracks like that before," said Kennely. "Look, here's more of the stuff." Kennely pointed to an almost invisible line of it on a small electric wrench.

Devon traced it along the cord into the conduit. They moved back to the section occupied by the machine tools. On each, they found thin silver lines running to the various elements. When they looked closely, the entire floor seemed crosscrossed with the threads. They went out to the materials storeroom and found the stuff swarming over the floor and up on the sides of the huge packing case that housed the unknown machine monster.

Mac came up as they looked over the maze of threads.

"Find anything?"

Devon shook his head. "You ought to spray the place with DDT. It looks like bugs are swarming all over you, leaving these trails."

Mac took a chisel and scraped at some of the stuff. "That's only a minor difficulty. We've been swearing at it for a week now. It won't come off anything, and no one can find out where it comes from. Why don't you make a project out of it? It would be about as useful as some of the dingbats you design."

"What's in the big box?" said Devon.

"Heaven only knows. I haven't had time to look. It came in with an order of materials several days ago. An engineer's gadget for his project, I guess, but nobody's claimed it yet. If they don't pretty soon, I'm going to ship it back where it came from."

The engineers left without coming to any conclusion. As three o'clock approached, they watched the sky expectantly. At twenty minutes before three it began to sprinkle and exactly on the hour the maximum precipitation was falling.

Kennely pulled his chair over by Devon's desk. "How many millions do you think it will be worth to good old North State?"

"Have you talked to Jackson about his gadget?"

"No. He saw that it wasn't as he'd had it drawn so he just sent it back for changes. So I don't know what it did—*special,* I mean."

"I'm getting worried about this business. It can't be supernatural."

"Let's come back tonight and take a private tour through the model shop."

"You think somebody might be working here at night? Why?"

"We haven't found anything in the daytime. It's a thought."

Devon was ready to try anything. He called Martha and told her he'd be working late. At five o'clock he and Kennely went out for a snack. When they returned, the assembly lines were dark and the labs were empty with the exception of two or three engineers working on their own time—apple polishers, Kennely called them.

The model shop was dark and deserted. The watchman opened it, and, as the door swung open,

they saw dimly in the darkness the giant brake slowly closing on a sheet of chassis metal. The clank of its reciprocating gears echoed ghostily in the darkened shop.

The watchman flashed a beam of light. "Who's in there?"

He switched on the lights. The brake was motionless.

"I'd have sworn that thing was working," said the watchman.

Kennely shrugged. "Nobody's here. It couldn't have been working."

The watchman left hesitantly with a final backward glance at the inert, giant brake.

"Brian, that thing *was* going!" Devon said when they were alone.

"I know. But I wouldn't want that watchman spreading word that the model shop is haunted."

"Haunted! Good grief!"

They moved slowly about the shop. On all the machine tools were partly worked pieces of stock, as if the equipment had suddenly ceased operation in the midst of heated activity. The engineers knew that Mac didn't allow his men to leave their machines in that condition. Kennely placed his hand on the motors and on the cutting tools. They were hot.

The suggestion of an intangible presence that had suddenly turned off all the machines the moment the door opened was oppressive. Certainly, the engineers knew that such a thing was rediculous and impossible, yet the impression was there, nevertheless.

"Maybe this is like the old fairy tale," said Devon. "The one about the little shoemaker who went to bed and found the good little gnome had done his work when he woke up."

Kennely strolled towards the opposite side of the room, glancing down at the silver threads criss crossing the floor. He stopped and pointed.

"Look, Chris. Maybe these bugs came in with some shipments. Look how these threads all seem to converge on this big box."

"Yeah, that's right. I'd never noticed it before. Wonder what's in the darned thing? Let's have a look."

He took up a hammer from a bench and began ripping at one of the boards, pounding and prying.

Abruptly, a heavy voice said, "Thanks, fellow. — That was just enough to unbalance the blanking matrix. Now we know where the thing is,—we can work on salvage."

The engineers felt the short hairs prickle on the backs of their necks.

"Kennely—was that you talking?"

"No—look! Those two guys—who are they?"

Beside the large box, two strangers were staring at the engineers. The two were not more than five feet tall. Their dress was not wholly alien, but the cut of the overall type garments was distinctly unfamiliar.

"Who are you?" Kennely demanded.

"I am Tarman, Chief Transport Agent, American Carriers, and this is our technician, Croul. We lost our valuable cargo and were about ready to pay the three quarters million that it would have cost us.

We are certainly grateful to you for unjamming the matrix and helping us locate it. We are not able, however, to spot it exactly with our equipment until you turn off your local radiation. If you would be so kind as to do that, we will move the shipment from your premises."

Kennely and Devon continued to stare while the strangers spoke. It must have been a considerable number of seconds after he was finished that Kennely finally opened his mouth.

"We don't understand all that," he said. "We never heard of American Carriers, much less a system of transport that could lose a cargo such as this inside a building. We thought this box belonged here. Explain yourself."

Tarman paled slightly and turned to Croul, who nodded. "I told you we were in the antique era. We shot clear beyond the delivery date. We'll lose our charter if this gets out. It's happened too often."

Tarman nodded and faced the engineers again. "This must seem all quite strange to you. We operate a transportation system through time, a temporal exchange agency. You know nothing of this, of course, because we have not touched your era before. It is not judged prudent that we do so by the Charter Council.

"The appearance of our cargo here was caused by some malfunction of our equipment, and our present inability to salvage it is caused by the radiation with which you have surrounded it. I trust that you will release it so that we may remove the cargo."

Devon whispered to Kennely, "Are we dreaming, or just crazy? This doesn't happen to a couple of solder slingers like us."

"We're neither—and it is happening to us," Kennely said with a fierce exultation that Devon did not comprehend.

"What kind of a cargo is this?" Kennely asked Tarman.

"I don't know, except that it's a piece of machinery known as an engine co-ordinator. It is used in large industrial plants to guide the processes of a large number of machines. In some manner the plans are scanned within the machine and the shop tools are guided in producing the equipment in the approved technical manner, which has been worked out and set into the engine co-ordinator. Much repetitive engineering is saved because mere rough sketches can sometimes be used to produce finished machines of great complexity. The technical details are already stored in the co-ordinator. Levitation and tractor fields are, of course, generated to handle materials.

"Will you please release our cargo, now?"

"I'm not so sure we want to release it," said Kennely slowly.

Tarman's face went white. "You mean you would attempt to steal it?"

"That's a rough word," said Kennely. "Say, rather, that we'd analyze this machine so that we could duplicate it. Allowing us access

to these principles should be fair reward for our return of it."

"That's blackmail! This cargo was due a week ago. We're already paying heavy penalty to the Black Machine Company for nondelivery."

"I'm afraid you're being rather ungenerous. If we hadn't disturbed the box you never would have found it—so you say."

Croul shook his head and looked at his superior. "I understand now why the antique eras are forbidden. Such barbarous relationships—"

"Croul, can't we possibly work through their radiations?"

The technician shook his head. "It's almost impossible to get it into focus. We might remove chunks of the local impedimentia without coming anywhere near the cargo."

"I'm sure we needn't be too concerned about that in view of the attitude the natives have taken. Try it."

"I wonder what radiation they are talking about?" said Devon.

"Maybe the microwave set that Calvert has got on life test upstairs. It's so full of bugs that radiation has been leaking all over for the last two weeks. Everybody's kicking about it. If that's what's keeping this gadget here, we'd better get a proper antenna and spray the place with radiation."

"You're thinking the same thing I am!" said Devon. "If we could copy this machine loaded with the techniques of maybe a thousand years from now—what a position we'd be in to open our own business! Hook it up to a shopful of tools and feed in rough blueprints and watch it turn out miracles—like a weather forecaster and a new type color television. We can't let this get away from us!"

"The levitation and tractor fields," said Kennely thoughtfully. "That would explain why it quit working as soon as we came near. Automatic safeguards for the operator."

They noticed now for the first time that they were looking at some kind of a projection of the strangers out of time, rather than at the men themselves. The projection seemed to include the image of some kind of technical plant which the engineers supposed was the equipment involved in transport through time and space.

The figures began to move around before the complex panels.

Kennely said, "Come on. Let's get this Alladin's Lamp opened up."

As they began ripping the crate apart, Tarman gave one last despairing cry. "Stop it, you fiends!"

The engineers continued. They observed that the multitude of silver threads all disappeared through cracks in the crate and disappeared within the black mass of the machine within.

"I'll bet that's a new method of wiring," said Kennely. "It looks as if our friends of the future simply place a machine near other machines and it hooks itself up like a spider spinning a web. Since this is a controlling device for shop machines such as ours, it automatically wired itself up and went to work. Perhaps some jolting due to

the mishap of landing here switched on the initial circuits.

"Machines that spin their own hookup wiring! But you must be right," said Devon incredulously.

Suddenly, there was a whine in the air, like the scream of a shell overhead. The engineers instinctively ducked, then the very earth upon which the plant was built seemed to rock.

The engineers turned slowly, fearful of seeing the walls crumple about them.

Devon pointed towards Mac's pride, the giant brake. "Look!"

Kennely stood agape. Half the brake was gone, sheared cleanly away, and there was a ten-foot hole in the earth beneath the floor.

"They play rough and potent," he said. "Mac is going to feel bad."

"Mac! What about us Look what would happen if they caught us half in and half out of that electronic cheese knife!"

"I think we'll be safe if we stick close to the gadget. That seems to be the point they can't hit because of Calvert's microwaves."

"But what if they should hit it? Where would we be? Brian! Where *would* we be? If this machine is only a single example of the science of the future, think where we'd be if we could go there and study. Let's make a deal with them. If they'll take us there, we'll let the machine go back."

Kennely shook his head decisively. "No. Absolutely not. It's too dangerous. We know nothing of the time transport machine. Maybe it can't carry live cargo. And I don't trust that guy, Tarman. He'd be just as likely as not to accept the offer, knowing that we'd come through crisped to cinders. I wouldn't want my neck in his noose for anything. We'll figure out some way to get this machine. That will be big enough jackpot for us."

"And you're the guy that's been shot at by Chinese bandits, South American Indians armed with poison arrow blowpipes, and by Jap fighter planes!"

"Exactly. That's why I say this is too dangerous."

They returned to the attack on the packing case.

"Give me a hand here," said Kennely. "These nails they use are something, too. They expand like fish hooks. Must be a trick of closing them to get them out—"

A second shrilling in the air turned them about. Slowly, as if dissolving in some mysterious acid vapor, a drill press and a section of the turret lathe vanished before their eyes.

"He's coming closer," said Devon.

Kennely tore the last of the packing case away. The machine stood exposed. It seemed featureless until he discovered the almost invisible snaps on the drop panels which revealed the faces of instrument panels complex beyond understanding. The engineers could see no external power connections unless some of the silver threads were tapping the power line. It seemed impossible that such thin carriers could supply the current

to operate a complex creation like this.

"It looks like they include a free copy of Webster's Unabridged Dictionary to all cash customers," said Devon. He nodded towards a receptacle where a thick volume reposed. He began to pull it out and glanced at the cover.

"Hey! This can't be . . . it is! Brian, here's an instruction book on how to run the gadget!"

He opened the thick tome to the middle while Kennely looked over his shoulder. He started to read aloud from a random paragraph:

". . . then the six paratempal tubes are connected in cycloid and the field stress advanced to six point three diams. The co-ordinator is shipped from the factory with this adjustment made for standard gravity, but with mass-inertia variations caused by changes in gravity it may be necessary to go through the entire process of setting the horostasis circuit in operation in proper sequence . . ."

"Cripes, Brian. We can't read this stuff. I'd like to bet that nowhere in these pages does it tell what a paratempal tube is and how it functions. Take any one of our own instruction books. There're a thousand references unexplained to anyone not equipped with the proper background. And we're definitely not equipped with the proper background to savvy this!"

Kennely nodded. "It'd take us months to plow through this and attempt to figure out the references. With Tarman biting chunks out of the plant we can't fool around about it."

They looked back towards the image of the time-distant control room of American Carriers. Tarman and Croul were busy over a computing desk, but they looked up as the men approached the projection.

"Are you ready to give up our cargo?" said Tarman. "We don't want this junk we're picking up from you, but I don't imagine it improves your surroundings to be cut up this way."

"We'll make a deal," said Kennely. "Let us have access to the co-ordinator long enough to copy it and we'll let you have it back."

"We must have it at once. Our charter would be cancelled if this became known."

"Give us twenty-four hours then, and we'll promise to release it."

"Intact?" Tarman's face set suspiciously.

"Intact."

"What will you do during those hours?"

"Try to make what analysis that we can."

"All right," the transportation chief sighed wearily. "I guess another day at this rate of indemnity won't completely ruin us."

"One other thing," said Kennely. "You must promise not to make yourselves apparent until we are alone here again."

"All right. Anything—as long as you promise to return our cargo within that time limit. Good-by."

For a moment the two strangers out of another age glared balefully

at the engineers. Then, abruptly, they vanished.

Devon passed his hand over his moist brow and looked around at the shambles in the model shop.

"I suppose it all happened. There'll be proof enough when we hear from Mac and Webber about this—"

"Yeah, it creates something of a problem, all right." Kennely walked over and stared into the depths of the hole where water was slowly accumulating.

"We'll come in in the morning and be surprised as anybody over the wreckage here. Then I'll tell Mac the gadget is equipment I've been looking for on my indicator project. I'll explain it got missent to the model shop and I didn't bother to investigate until I needed it. That ought to hold water."

"What did you mean when you told Tarman you'd return the machine in twenty-four hours? You know we can't do anything in that time."

"We can't—unless we think of some kind of a deal to make with him. They must want *something* we've got. Anyway, it gives us that much delay and keeps them from biting the whole plant in little pieces."

"O.K. Let's call it a day and

clear out of here. We can't do anything tonight. We'll sleep on it and talk it over in the morning.

Devon's sleep during the remaining few hours of the night was anything but restful. His nightmares were filled with enormous termites that were chewing up the house a cubic yard at a time, and he ended up in a cold sweat at five thirty, looking and feeling as if he'd been on an all-night binge.

He dreaded the idea of going to the plant. Kennely could carry off a thing like this without a flick of an eyelid, but Devon could hardly get away with it. He couldn't josh Mac for getting plastered and tearing the shop apart and become just the right shade haughty at the slightest suggestion that he knew something about the business because he was there last night.

He found what he expected as he walked down the hall towards the model shop on the way to the lab. The entrance was completely blocked by a mob of other engineers and assembly-line workers trying to get a glimpse of the mysterious holes in the floor, and the machinery that had been sliced.

As Devon struggled to ease past the mob, he saw Kennely in the center of things up front, being properly amazed and speculating aloud as to the possible causes. He spotted Devon.

"Chris! Come and see what Mac's been doing!"

The mob parted its ranks to let Devon through. He pushed his way in and stood face to face with the disaster. Webber was there, bleak with mystification and anger looking for a place to strike.

"The watchman says you and Kennely left around midnight. Kennely says you didn't hear a thing or see any signs of this, then."

"No. Not a thing," said Devon. Somehow the daylight and the mob lent an aspect of magnitude to the disaster that dwarfed his feelings of the night before.

"As I told you," Kennely broke in, "we just unpacked the case to see if it was my missing equipment—"

Webber glowered down into the hole another thirty seconds, then turned to Mac. "Get maintenance to clean this mess up as soon as possible. Reorder the machine tools you need. I'll push the papers through. We can't get much farther behind on the model work. We'll be making last year's equipment next year at this rate!"

Back in their own lab, Kennely and Devon sat down at their desks. "Figure out anything?" asked Kennely.

"Nothing but nightmares all night."

"Me, too. An engineer is no good in a situation like this. An average smart business man would be able to think up a deal that would bring Tarman across pronto. But here we are, can't think of a thing."

"Well, let's get to work. Let's analyze that prognosticator panel and maybe we'll think of something as we go along."

They spent the remainder of the day delving into the complex cir-

cuits of the weather forecaster. The components were there; their circuit connections became apparent as the engineers proceeded, but the actual principle of operation was still elusive.

When the entire circuit was finally traced and sketched in their log books, they still had no conception of the means by which these elements could forecast weather factors. They could trace the paths by which voltage was applied to the aneroid barometer action to register the future instead of the present air pressure. They could observe the control tube action which governed that voltage, and traced it back in a complete circle to the aneroid itself, which seemed to provide the controlling impulses.

It was a maddening circle in which something appeared that did not seem at all related to that which was fed in.

As the afternoon waned and the other engineers prepared to go home, Kennely and Devon began building up the circuit again for dynamic tests to try to find the missing factors.

"I've been thinking," said Kennely. "I believe I've got a little deal that Tarman will fall for. Let's knock off now. I'll tell you about it tonight. Let me call for you at your place about midnight. By that time we can be sure that all the apple polishers around here will have gone home."

"Tell me what you've planned."

"I'd rather show you. There'll be plenty of time, and I've got to do a little more thinking on it."

Devon saw no reason for Kennely's reticence, but he didn't feel like arguing the matter.

"O.K." he said. "I'll wait for you. I hope you've got something good because Tarman will start chewing up the rest of the plant if we don't let the co-ordinator go back."

"I don't think we're going to have to worry about that, and I think we're going to have our consulting office, too. See you tonight."

Devon drove slowly on the way home. Throughout the day his mind had been furiously active on his own plans—the same plan he had proposed to Kennely the night before.

The appearance of Tarman and Croul, and the revelation of the great science of the world of the future seemed an opportunity that would be criminal to reject. He could not understand Kennely's refusal to attempt to go there because of the supposed danger.

These men of the future seemed civilized. An idea of their morality was indicated by their reaction to the engineers' withholding the co-ordinator. They obviously viewed that as the mark of an inferior culture.

There could hardly be extreme danger in attempting to force a visit to their world. Their reluctance to establish contact could surely be overcome.

But there was another factor, one of the main factors, he admitted to himself. His life had been chained to a slide rule and a desk while Kennely had spent his in adventuring

around the world. This was the opportunity for adventure that no deskhound, handbook engineer could afford to pass up no matter what the cost.

The cost—

Martha, Kip and Pat. They represented all the real values of his life. There might be a chance of his not coming back—

He had to take that chance, he told himself desperately. Any man in his place would have to take it. Perhaps to Kennely, who had adventured all his life, it didn't seem like much. Perhaps the mere acquisition of the co-ordinator was enough for him, but to Devon the personal exploration of that future world was even more important than the machine. Besides, what other marvels might be obtained?

His mind was definitely made up. He'd go down to the plant around ten and try to make contact with Tarman and Croul. He'd offer to release the co-ordinator instantly if they'd take him along. They couldn't refuse a request like that.

When Devon arrived home, Martha had a steaming dinner ready. He thought she had never looked quite so pretty as she did that night in the blue gingham and with her face flushed gently with the effort of getting dinner.

"Kip and Pat are ready, darling," she said. "You're late—as usual. Something important doing tonight?"

He kissed her. "Rather. I've got to go back later. About ten."

"Why so late?"

"Some special stuff that depends on time. I don't know how long I'll be."

He didn't know how long he'd be—

He looked at Martha and the children. He couldn't kid himself out of the knowledge that he was planning to gamble them and everything else he had on this fantastic sweep into the future.

But he had to go. Just *had* to—

This would give him and Kennely the one break they needed, he thought. With knowledge of the co-ordinator and other machines like it, they could command the trade of the whole electronic world. They'd be free to develop the research labs they'd always dreamed of.

More than that, it would satisfy the hungry yearning something that Devon had felt when he'd seen Kennely go off to the South Seas during the war to do field engineering in war-contested skies.

It was a sort of desperate need to prove himself. He had to do at least one *big* thing in his lifetime.

He felt guilty as he sat down to listen to the radio for a while. Martha sat on the arm of the chair and talked. He ought to tell her, he thought, but she'd tell him how dangerous it was and how much she and the children needed him, and he wouldn't go.

Ten o'clock approached, and he began looking at the clock apprehensively. Martha said, "I'll fix a sandwich and coffee to take with you."

At just five minutes to ten when he was getting his hat on, the phone rang.

"Hello, Chris," said Kennely. "I haven't got much time to tell you this. Maybe only a couple of minutes. I made a deal with Tarman and Croul. I thought I wouldn't call you, but I wanted to say goodby. I left a note in your desk here—"

"Brian! What are you going to do?"

"The only thing possible, Chris. You know what it is. I saw it in your eyes. That's why I couldn't say anything. Read my note. Got to go now. Tarman's—"

The phone went suddenly dead. Devon dropped it and raced for the front door. "That was Brian, Martha. He's at the plant now. Got to run. Don't wait up for me."

He ran down the front walk and jumped into the car. He swung savagely away from the curb and into the stream of traffic.

As he drove, the surging hatred within him boiled like steaming, corrosive acid, eating at the structure of the lifelong friendship between him and Kennely.

Kennely had known that Devon planned and wanted to go into the future. That's why he had condemned Devon's plan the previous night. He'd gone on alone, because he couldn't share the adventure and the glory. Devon should have known, instead of being blinded by Kennely's bland insistence upon the danger of the project.

The night lights illuminated the front of the plant in glaring brilliance as he drove through the wide gates. It took him five precious minutes to get the watchman. The latter was disturbed by Devon's agitation.

"Open the model shop," Devon demanded. "I must get in there at once!"

The watchman was a new one and slowly checked Devon's company identification, then turned and led the way with maddening, ponderous omnipotence over engineers who wanted access to the building in the hours when only watchmen reigned.

Sweat was bursting like ripe pods on Devon's face as he surged ahead when the model shop was in sight. It was dark. He pressed his face against the glass and shielded his eyes with his hands. There was no sound or light or sign of human presence.

Devon turned with a start as the sluglike watchman rattled the key. Then he was inside. His finger found the switch, commanded the light that flooded the broad room of the shop.

It was like the agony of waking from the grasping fingers of a dream reluctant to give up its clutch upon his mind. Reality slowly forced back grudging memory and he stood there with a slow sense of devastation swirling about him like a knee-deep flood.

The brake—Mac's six thousand dollar wonder—was there.

Intact.

The machine tools, the floor, the workbenches were just as they had been before the impossible dream out of the future had disturbed Devon's uneventful, handbook life.

It was all as before—

Out of his own disappointments a terrible, corrosive hate distilled through his veins and condensed in the cold chambers of his heart and his brain.

Kennely had been here and made some kind of bargain with Tarman. They had returned the materials slashed from the shop, and Kennely had gone with them. He had gone to steal the show for himself, as always, to keep this ultimate of human experiences for himself alone.

Brian Kennely, the cavalier engineer—

Devon's legs began to move against the sluggishness in them. He moved towards the storeroom where every evidence of the mighty engine co-ordinator had vanished. Then he glanced down and stooped to pick up something from the floor.

The clipped remains of a telephone cord.

So Kennely had been taken just as he was talking with Devon. There was some final, terrible desolation in this. He dropped it quickly and hurried back towards the door where the watchman still slumped against the casing, his eyes squinty with enforced wakefulness and suspicion.

"Open up the developments lab," said Devon. "I'm going to work there the rest of the night."

In the lab, he flooded the place with light and slumped down at his desk. He began rummaging for the note Kennely had said he'd left. Devon finally found it in the middle drawer where Kennely had slipped it through a crack.

For a moment he hated the substance of the note as much as whatever message it might hold, and the man who had written it.

Then he unfolded it and began reading:

O.K., Chris, you're hating my guts right now, but remember what you're always preaching to the dumb junior engineers they hire around here? The right component for the job. Remember? For this job that's me, not you.

You've envied the way I've done things. You've made that plain. But isn't it funny that I've always envied the things you've had, too? Don't you know I'd trade you a thousand times over?

Yeah, Martha and Kip and Pat. Don't you know you can't go barging around acting like a—cavalier—when you've got them?

You wanted that field-engineering assignment on the Navy job and you'd probably have had it, too, and those Jap bullets that came so close to me missed maybe because they had *your* number on them. Besides, who'd have slugged out that design on the BC-62 command set? Two or three thousand guys, at least, owe their lives to you for that.

It all adds up to using the right component for the job, and that's only good engineering. You wouldn't try to use a 600 volt by-pass on a 10,000 volt plate supply. Nor a 10,000 volt by-pass in that beautiful little BC-62.

I'm the right component for this job. You're not equipped for it, but you're swell in the job you're doing. Let's not get hashed up with a lot of feedback over this business. I've talked Tarman into smuggling me into his age. He's no different than the Chinese bandits I once slugged it out with in Manchuria, sort of a truck driver and petty racketeer in his own day. He'd have your hide in an hour, Chris. I don't know what I'll find in his territory, but I suspect that there

are pretty strict rules against interlopers from unauthorized ages. It won't be easy to fake their customs and mores sufficiently to get by as a local citizen. And then there's the job of getting back if I do succeed in passing myself off and collecting some of their science. Tarman gave me some tips on how it might be done, but I don't trust him. I feel reasonably sure I can do it. This chance at their science is worth the gamble. If I lose there'll be no loss—to Martha and Kip and Pat.

So calm down and squelch those parasitics that are no doubt burning up your plates. Look for me back any time. I'll try to swing my return as close to my departure as possible. But when I come I'll have a slug of stuff that'll make us the top outfit in the business—Devon and Kennely. Better start looking around for some offices. If any of the boys ask about me just say I'm on an indefinite binge. Be looking for me.

Brian.

Devon put the letter down slowly. As he did so, he felt as if cooling, placid currents had begun to flow through him, quenching the bitter fires that had raged, and smothering the disappointment.

The right component.

Yeah, that applied to men as well as engineering factors and Kennely was right. He was the component for this job, not Devon.

Was there anything that Kennely didn't understand? Devon wondered. The man's genius extended not merely into the broad field of electronics where he was master, but into all the facets of life.

Devon felt sudden, bitter shame for the feelings he'd had. They were both the right components for the jobs they were doing. As a team they'd be great, as long as he could keep from trying to invade Kennely's half of the partnership.

Right now he had a big enough job to keep him busy until Kennely's return. He had to get an entire new model of the weather station out of the model shop by another week. The Weather Bureau could use the prognosticator circuits, all right, but not in the little remote stations. It would be worth plenty to North State. That aspect of it made Devon momentarily unhappy, but there'd be plenty more where that came from—when Kennely came back.

When Kennely came back—

For a single bleak and bitter moment he considered the alternative to Kennely's return. Then he forced the dark vision out of his mind. Kennely'd be back. He was the right component for the job. That was foolproof engineering.

Devon suddenly leaned back and grinned to himself. There was one nice, unlooked for advantage in Kennely's absence. It would be possible now for somebody else to get a job out of the model shop.

THE END.

IN TIMES TO COME

Jack Williamson is back with the second long novelette, a quietly intense piece titled "With Folded Hands . . ." It's about robots, and how to serve and obey and protect Mankind. One of the neatest little one-way traps I've seen discussed in a long time—and a yarn worth the reading, and the thoughtful consideration of those who read.

Poul Anderson, of "Tomorrow's Children," is also back, with a sequel that has an interesting new thought—concerning thought and its methodology. Have you ever studied out something like a radio circuit, with all the various paths for the currents, going in a dozen different directions simultaneously, and considered the strange way electrons succeed in getting in all the right places at the right times without getting lost? Pity that human thoughts can't do a trick like that.

Our appeal for new authors in the December editorial is beginning to bear fruit. We have received a number of manuscripts and several of the submissions look very promising. Our continuing contest—our regular monthly buying program—is always open to all who can write. And a lot of you could if you try. As in any other business there is always room at the top and we are always seeking for a new top author.

Speaking of authors, new and old, does anybody know where Webb Marlowe is? We have a check for him since last September . . .

THE EDITOR.

THE ANALYTICAL LABORATORY

Here's how the readers liked the February and March issues:

FEBRUARY 1947

Place	Story	Author	Points
1.	Maturity	Theodore Sturgeon	2.73
2.	Tomorrow and Tomorrow (Conclusion)	Lewis Padgett	2.95
3.	The Timid Tiger	Eric Frank Russell	4.03
4.	Pete Can Fix It	Raymond F. Jones	4.15
5.	The Answer	George O. Smith	5.2
6.	Eye To The Future	Ree Dragonette	5.61

MARCH 1947

1.	The Equalizer	Jack Williamson	2.0
2.	Tomorrow's Children	Poul Anderson and F. N. Waldrop	2.76
3.	Child's Play	William Tenn	2.84
4.	Little Lost Robot	Isaac Asimov	3.04
5.	Turning Point	Pendleton Banks	4.24

THE EDITOR.

NEWS FROM OUR SUN

BY J. J. COUPLING

The sun sends us light and heat, of course. But only recently have men found that it's quite a radio broadcast station. And even more recently, they've learned how to read the personal history messages modulated on that really Big Broadcast!

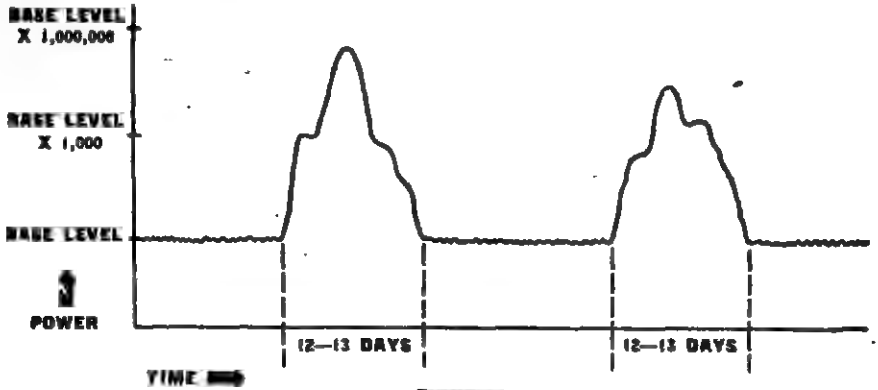


FIGURE 1

A day-by-day plot of 200-megacycle radiation from the sun. The power level marked "base level" corresponds to a temperature of around 1,000,000 degrees absolute. Sunspots produce bursts of power 1,000 to 1,000,000 times as great, persisting for the time it takes the spots to pass across the face of the sun (¼ of the sun's period of rotation).

It's with some trepidation—the ordinary, not the astronomical kind—that I dare tread near the toes of R. S. Richardson, who has told the readers of Astounding much more about astronomy than I can ever hope to learn, let alone to impart. Strange things are happening these days, though, and radar experts who wouldn't think of pointing a telescope at the heavens have, nevertheless, been listening in on the stars. What they hear isn't exactly the harmonious music of the spheres the Pythagoreans talked about. Plainly speaking, it's just noise. If you listen to it, it's like a scratchy phonograph record with no music. But, if you measure it, and plot it day to day, it tells a story. One of the best parts of this story is the chapter about our sun.

The radio experts have actually been listening in on the heavens for some years. Back in 1933 K. G. Jansky of the Bell Telephone Laboratories discovered a random radiation from the general direction of the Milky Way. In those days waves weren't so short and antennas weren't so directive. Jansky used a moderately directive antenna and made measurements at a wave length of fourteen meters. With that equipment he definitely didn't find any signal from the sun. Then, during the war, in 1942, Dr. G. C. Southworth, also of the Bell Telephone Laboratories, pointed the antennas of sensitive microwave receivers, such as were used in radar, at the sun. He did find electromagnetic radiation at wave lengths around one, three and ten centimeters, as had been expected. It turns out, however, that Jansky's

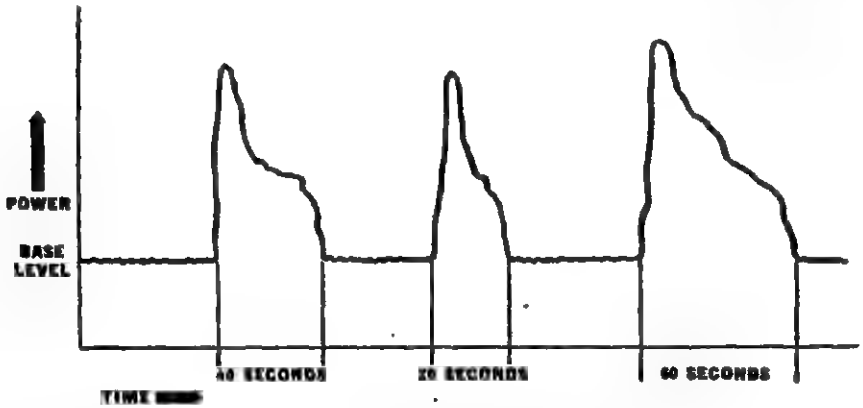


FIGURE 2

Minute-by-minute plot of 200-megacycle radiation from the sun. The short bursts, perhaps due to solar prominences, are characterized by a rapid rise in intensity and a more gradual decay.

wave length was too long, and Southworth's too short to get some of the most interesting information the sun sends us by radio, and it was only in the last twelve months that Dr. E. G. Bowen, working at Sydney, Australia, received and deciphered this.

You might wonder why we had to wait so long to hear from the sun by radio. Certainly there's no trouble detecting heat and light from the sun. With a burning glass, the electromagnetic radiation — that's what heat and light waves are—is strong enough to start a fire, or even to melt a diamond. Yet, we've had to wait for the very sensitive receivers and the highly directive antennas developed during the war to detect and measure the part of the sun's radiation which lies in the radio range. The obvious conclusion would be that the sun doesn't send out much energy at radio frequencies, and in one way this is true. Yet, in another way, the sun is much hotter at radio frequencies than it is in the range of visible light or heat waves.

The truth of the mater is that from the radio point of view it's just a question of bandwidth! Any hot body emits random, mixed-up electromagnetic energy of many frequencies. Now, at low frequencies the energy emitted by a hot body of uniform temperature is uniformly spread out through the frequency range. If we have a receiver of short waves, or long waves, or infrared which picks up all radiant energy falling on a unit area and lying in a frequency range say ten megacycles wide, we'll get the same amount of energy no matter where the ten megacycles lies in the frequency range. This isn't quite correct, for at very high frequencies the energy falls off, but for a very hot body like the sun it's nearly enough true for our purposes clear up to the frequencies representing visible light. For a very hot body of uniform temperature, there's just as much energy in the part of the one-and-a-half meter band lying between 200 and 210 megacycles as there is in the part of the infrared band lying between 300,000,000 megacycles and 300,000,010 megacycles.

The last figures pretty well tell the story, of course. Ten megacycles is a wide bandwidth as radio-frequency bandwidths go, but it's pretty narrow when we think of light and heat. The visible spectrum occupies a frequency range or bandwidth of some 400,000,000 megacycles, a band 40,000,000 times as broad as our "broad" ten-megacycle radio band. When we look for solar radiation with a radio receiver, we're being pretty choosy of what we take, and it's no wonder that we don't get much. Your back when it is warmed by the sun accepts electromagnetic radiation over a frequency range more than 40,000,000 times as broad as that accepted by a broad-band radio receiver pointed at the sun, so it's no wonder that the radio has difficulty. In fact, a radio receiver with a bandwidth of ten megacycles could receive only about a millionth of a millionth of a watt from a hot

body at a temperature of six thousand degrees Kelvin—The temperature indicated by the visible radiation of the sun. It's not surprising that it takes a modern, sensitive radio receiver to measure such a small power.

There's another catch, too. If we want to examine the sun, it is best to have a highly directive antenna which picks up energy just from the direction of the sun and not from all over the sky. Now, the sun occupies an angle of about a half a degree in the sky. A penny held seven feet away would just about cover it. If we pointed at the sun a highly directive microwave antenna which would receive radiation coming in over an angular range of a half a degree only, we would get just radiation from the sun. A directivity of half a degree is pretty good even for microwave antennas, however, and at one and a half meters—two hundred megacycles—even a huge antenna twenty-five feet across picks up energy over an angular range of around ten degrees. If we point such an antenna at the sun we see 1/400 sun and 399/400 sky, and this makes it even harder to tell what is coming from the sun.

With these odds of insignificant bandwidth — compared with the bandwidth represented by visible light—and insufficient angular discrimination—compared with the angular width of the sun—it would be impossible to measure the radio-frequency energy emitted by the sun—if the sun weren't so very, very hot. And that brings us to one of the chief points of Bowen's news—how hot the sun is. The sun *looks* as if it had a temperature of around six thousand degrees absolute. That is, it gives off as much light, or *visible* radiation as a solid body at that temperature would. This is only part of the story, however, for astronomers estimate that the temperature of the interior of the sun is not six thousand degrees but around twenty million degrees. If one wants to know how hot the sun seems according to its radio-frequency radiation, perhaps the best thing to do is actually to "look at it" with a highly directional antenna connected to a sensitive radio receiver, and that is just what Dr. Bowen did. He measured the radiation of the sun at frequencies around two hundred megacycles carefully, day by day and even hour by hour, over a period of a year, and then he measured the radiation at several other frequencies as well. He found the temperature of the sun at two hundred megacycles and at other frequencies, and he found something else besides.

Suppose we look at a plot showing the sort of data Dr. Bowen got. Plotted on a day-by-day basis, it looked pretty much as shown in Figure 1. For days at a time the power would hover around a certain base level. Then, however, it would gradually rise to values one thousand to one million times as high, remaining above base level for from twelve to thirteen days at a time. The steady base level of radiation and the dizzying long-term bursts

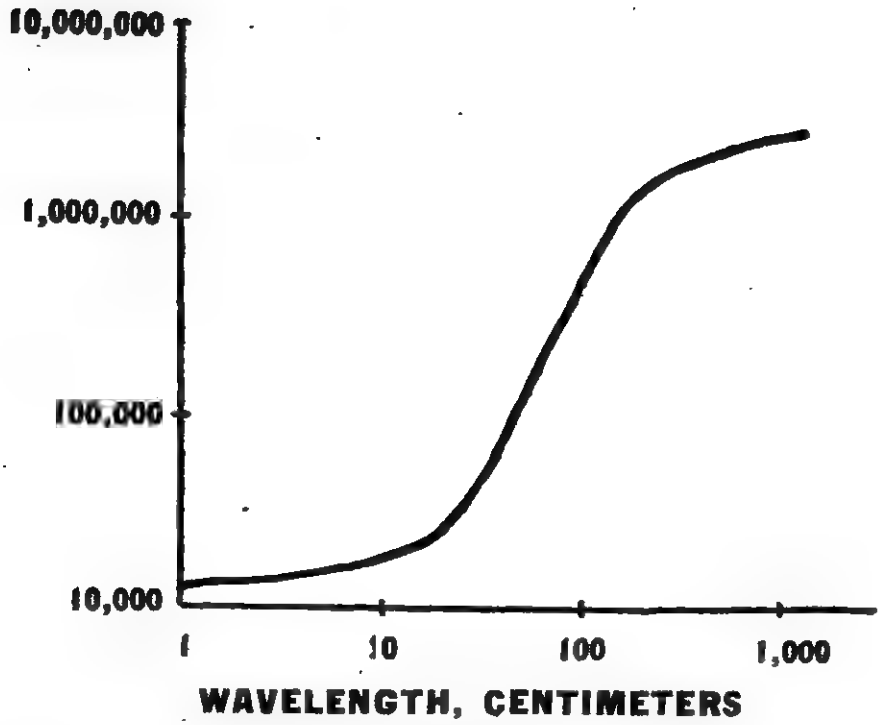


FIGURE 3

A rough curve showing temperature of the sun vs. wave length of radiation in centimeters. The wave length is 30,000 divided by the frequency in megacycles. The present score is about as follows:

Radiation	*Temperature*
.00003 cm. (light)	*6,000*
1	*12,000*
10	*20,000*
25	*40,000*
150	*1,000,000*
500	*2,000,000*

of radiation aren't the whole story, however. The time scale of Figure 1 is too rough to show everything which happens. Suppose we plot the power received on a minute-by-minute or second-by-second basis as in Figure 2. This shows another, more frequent, short term kind of burst of radiation, one that rises sharply to a peak, falls off rapidly and then more gradually, and is all over in from ten to sixty seconds.

Such short bursts of radiation occur on the average two or three times a day, though some days will pass without any.

Apparently, these measurements give us not just one piece of information, but tell us about three distinct phenomena, the steady background or base level of two hundred megacycle radiation, the long twelve to thirteen day bursts of radiation, one thousand to one million times as intense, and the more frequent—two a day—short bursts of radiation lasting only a few tens of seconds. This is already more than one might have hoped to get just by listening to noise. However, there's more as well, for each phenomenon can be made to tell a story.

Take the steady background of radiation which persists between the bursts. This, if anything, will tell us about the temperature of the sun. What it tells us, however, is something quite different from what radiation of light frequencies tells us. Our eyes, or optical instruments, tell us that the temperature of the sun is six thousand degrees. The two hundred megacycle radio waves it emits tell us its temperature is one million degrees! What's wrong,

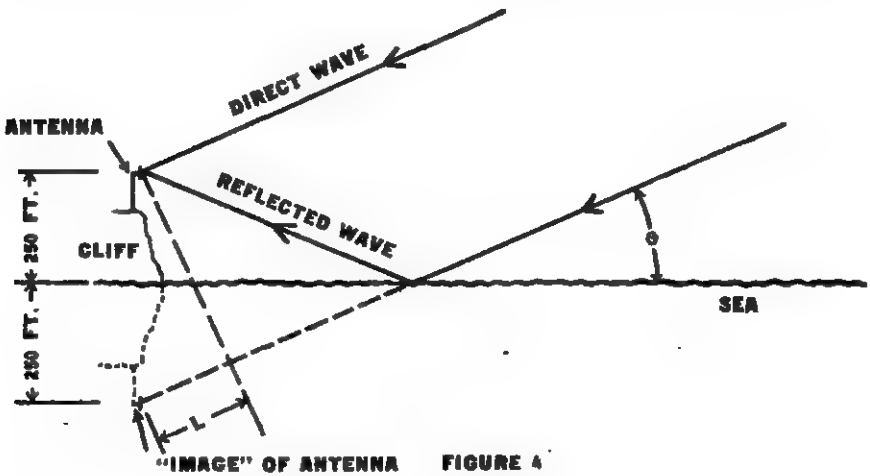


FIGURE 4

The antenna looking eastward to the sea—at Sydney, Australia, and looking at the sun. The reflected wave travels a distance L farther in getting to the antenna than does the direct wave. When L is ½ wave length, 1½ wave lengths, 2½ wave lengths, et cetera, the waves reinforce and a very strong signal is received. When L is 1 wave length, 2 wave lengths, 3 wave lengths, et cetera, the two waves cancel and no signal is received. Here we have just a radio-frequency interferometer.

here? Are we really looking at the same thing in both cases?

When the question is put that way, it's obvious that the answer must be no. The eye sees one part of the sun, but the two hundred megacycle radio receiver sees an entirely different part! This shouldn't be so surprising, after all. The eye doesn't see the interior of the sun, which the astronomers infer to be at a temperature of twenty million degrees. The reason is, of course, that the upper layers of the sun are opaque to light. The light from the very hot interior just can't get out, and we see a cool upper layer instead. What we see is an outer layer called the *photosphere,* which is the *visible* surface of the sun. It isn't the *outside* of the sun, however, for outside of the photosphere are two other layers, the *chromosphere,* a tenuous gassy layer immediately outside of the photosphere, and the *corona,* a deep and extremely tenuous atmosphere mostly electrons with a few highly ionized ions outside of the chromosphere. The corona is the magnificent luminous envelope of the sun which used to be visible only during total eclipses, and which can now be seen and photographed under favorable conditions with the coronagraph.

Now, the chromosphere and corona are so tenuous as to be almost completely transparent to light. This doesn't mean, however, that they are transparent to all radiation. We see through the Earth's Heaviside layer, but the Heaviside layer is opaque to radio waves of longer wave lengths, and the longer the wave length of the radio waves, the denser and more opaque the Heaviside layer seems to them. The Heaviside layer is opaque to long radio waves because, like the sun's corona and chromosphere, it is composed of ions and electrons. The rapidly fluctuating electric field of light waves pushes on these charged particles first in one direction and then in the opposite direction, but it doesn't push in one direction long enough to make the electrons move very fast or very far, or, to give them much energy. The more slowly fluctuating fields of low-frequency radio waves act in one direction long enough to give the electrons and ions an appreciable velocity and an appreciable energy, which the particles absorb, of course, from the radio wave. Hence, an ionized medium such as the Earth's Heaviside layer or the sun's corona absorbs the radio waves which travel through it. Thus, when we look at the sun with our eyes, by means of the very high frequency radiation called light, we see right through the ionized corona and chromosphere, but when we "look at" the sun by radio, these layers are opaque, absorbing the radiation of the photosphere beneath as the photosphere absorbs the light from the interior. If we looked at the sun with radio sets tuned to higher and higher frequencies, we would expect to see farther and farther into the corona and finally down to the photosphere as we do by means of light.

What the base level of Figure 1 represents, then, is not the tempera-

ture of the photosphere, but the temperature of the corona, which, according to the radio measurements at two hundred megacycles is one million degrees. Gratifyingly enough, this temperature agrees with estimates previously made. During eclipses the corona can be observed visually. The amount of light scattered by it leads to an estimated temperature also around one million degrees. Lines due to iron ionized fourteen times have been observed in the spectrum of the corona, and it should take a temperature of around a million degrees to ionize iron to this extent. Finally, bursts of electrons emitted from the sun which reach the Earth around twenty-four hours later appear to have velocities consistent with this temperature.

All this is very gratifying. So far the two hundred megacycle measurements agree with all astronomical data as to the temperature of the corona. But, what about the matter of the corona being more and more nearly transparent for radiation of higher and higher frequencies. Here, too, the data fits, and Figure 3 tells the story. At a wave length of one centimeter—thirty thousand megacycles—we see well down into the chromosphere, and the temperature appears to be only about twice that for light. At ten centimeters — three thousand megacycles—the temperature is up to around twenty thousand degrees. A little above this the temperature rises steeply with increasing wave length; the corona is becoming almost opaque. Up around one hundred centimeters or one meter—three hundred megacycles—the curve starts to level off again in the vicinity of one million degrees. The radio measurements not only fit astronomical estimates, but they show the expected variation with frequency or wave length as well. These radio measurements have probed the sun and given us—very roughly, as yet—the temperature layer by layer. That's a lot to get just from noise, and merely background noise at that.

But, what about the bursts? What more do they tell us? The fact that the long bursts have a period of twelve to thirteen days certainly ties them in with the rotation of the sun, for that's half of its period of rotation. It isn't hard, either, to guess that the source of this very intense radiation, appearing when a part of the face of the sun is turned toward us and disappearing when it is turned away, may very well be sunspots. The obvious thing, then, is to look for a correlation between sunspots and the intense long-term bursts of radiation.

Correlating phenomena with sunspots is, of course, an old story. It's probable that the income of rat catchers in Buenos Aires could be correlated with sunspots—the more rats, the more income; the more wheat, the more rats, and the growth of wheat is, of course, correlated with the weather, which in turn ties in with sunspots. Still, the tie-in between the sunspots and the income of the rat catchers would be indirect at best. The question is

whether the sunspots really are directly responsible for the bursts of radio waves.

The correlation in time and intensity is very very close. A plot of sunspot area vs. time over a period of six months showed almost exactly the same ups and downs as a plot of noise received at two hundred megacycles. Still, the radiation might merely accompany the spots, and not come from it. It would be nice to have very direct evidence that the noise actually comes from the very part of the sun on which the spots are located. At first thought, this seems to be asking too much, at two hundred megacycles, at least. The sun has an angular diameter of only a half a degree. It would seem that to locate the source of the noise on the sun an antenna with a directive pattern less than a half a degree wide would be needed. Now, a simple calculation shows that for two hundred megacycles, one point five meters, an antenna with a half degree directivity would have to extend around six hundred feet in at least one direction. To have great directivity an antenna must extend many wave lengths. Highly directive antennas can be made in the microwave region, but at two hundred megacycles they become ridiculously large.

The case would seem, offhand, to be hopeless. There aren't any six hundred foot antennas for two hundred megacycles, and it seems unlikely that anyone would build one just to measure noise from the sun.

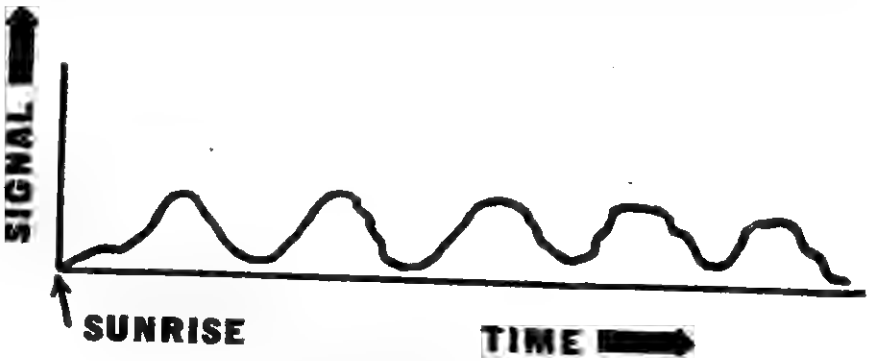


FIGURE 5

How the signal strength varies with time after sunrise during a 12-13 day burst of radiation. The ratio between the maximum power and the minimum power indicates the width of the source and the locations of the maxima and minima indicate the position of the source.

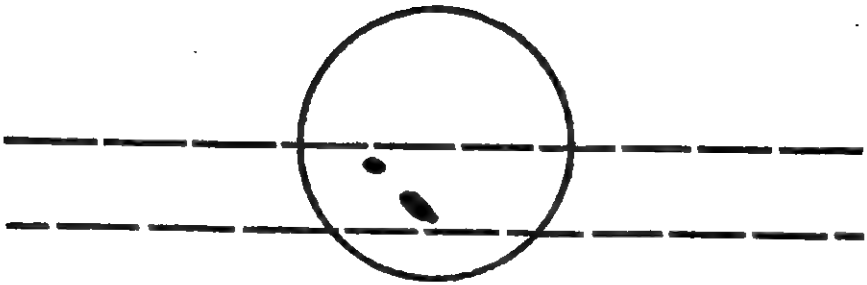


FIGURE 5

Data such as that indicated in Figure 5 bracket the source of radiation between two parallel lines across the sun's disk, as shown here. And, sure enough, the lines always do bracket the sunspots which are the source of the intense radio noise.

Strangely enough, the case isn't hopeless, or even bad, but it took the ingenuity of the Australian scientists to find the solution. When they had it, they were ideally situated to use it. Sydney is located on the eastern coast of Australia, looking out toward the sunrise. And at Sydney there are high cliffs overlooking the sea. All that was needed was an antenna on the cliff-top, some two hundred fifty feet above the water. How did this help? Figure 4 tells the story.

Imagine radio waves slanting down from the sun. They will travel practically parallel because the sun is so far away. Now, part of the radio waves are headed directly toward the antenna, and strike it directly. Others, however, are reflected from the sea, and the reflected waves reach the antenna. The reflected waves, however, have to travel farther to get to the antenna than the direct waves do. In fact, the reflected waves, as we can see from Figure 4, have to travel just as far to reach the antenna as they would have had to travel, if they'd continued in a straight line without reflection, to reach a point five hundred feet directly below the antenna. In fact, the situation is just as if we had two antennas, one five hundred feet below the other—the "image" of the real antenna—and added the signals the two antennas picked up. Here is just the unreasonably big antenna system we needed!

The *directive pattern* of this antenna system is rather odd. A look at Figure 4 shows that the reflected wave must travel some distance L farther than the direct wave in reaching the antenna, and this distance L increases as the angle of arrival O becomes greater, that is, as the sun rises higher above the

horizon. Also, the reflected wave suffers a reversal of polarity as reflected waves always do, and this must be taken into account. If the distance L is a half wave length or any *odd* number of half wave lengths—at two hundred megacycles this would be .75, 2.25, 3.25 meter, et cetera—the reflected wave will reach the antenna exactly in phase with the direct wave and reinforce it strongly. If, however the sun's height above the horizon is such that the angle or arrival of the waves makes L an integral number of wave lengths (0, 1.5, 3.0, 4.5 meters, et cetera) the reflected wave will arrive exactly out of phase with the direct wave, and cancellation will take place. Thus, for certain angles of arrival practically nothing will be received, and for certain other angles, almost twice the direct energy will be picked up. Incidentally, the reversal of phase of a reflected wave referred to above is in large measure responsible for the failure of low-frequency radars to pick up low-flying planes, particularly when the radar antenna is not mounted very well above the ground-reflecting level.

Returning to our consideration of solar radiation, let us see what happens as the sun climbs above the horizon.

If all the noise is coming from a very tiny source, a sunspot, we will alternately get a strong signal, no signal, a strong signal, no signal, et cetera, as the sun rises higher and higher above the horizon and L progressively increases. Suppose, however, that the noise comes from all parts of the sun's disk. The sun's disk is broad enough so that if L is such as to give no signal for waves coming from the upper edge of it, then L is such as to give a very strong signal for waves coming from the lower edge of it. Thus, if the noise came from all over the sun's disk we should expect little periodic fluctuation of the signal as the sun rises.

Actually, when a record is taken of signal power versus time after sunrise during one of the eleven to twelve day periods of intense noise, it looks somewhat as shown in Figure 5. There is a strong fluctuation, but the signal never goes quite to zero. This indicates that the noise is coming from a region narrower than the whole disk of the sun but wider than a single sunspot. And, in fact, the width of the region from which the noise comes can be calculated from the strength of the minimum signal relative to the maximum strength. Too, by noting the time after sunrise at which a maximum occurs, the location of the source of noise on the sun's disk, high, low, or in the middle, can be calculated. Thus, by observing both the relation between the maximum and minimum signal strengths and the time at which maxima or minima occur we can fix the width and location of a strip of the sun's face from which the radiation is coming as indicated in Figure 6. And, we ask, are the sunspots which have been blamed for the noise in this strip? Emphatically, yes, and always! The strip may be broad, indicating several scattered spots,

or very narrow, indicating one intense one. Always, however, the noise comes from just where the spots are!

This has pretty well pinned down the source of the long bursts of noise to sunspots. The noise intensity closely follows the sunspot area, and the noise comes from the part of the sun's disk where the spots are seen. There's one smaller added piece of evidence which might be mentioned, however. The bursts of noise are circularly polarized radio waves, and this circular polarization can be explained in terms of the strong magnetic field associated with sunspots. All the evidence points in the same direction.

What, then, of the short, ten to sixty second noise bursts, the ones which occur on the average about twice a day? Here, conclusions are less certain. For one thing, it has been impossible to correlate the occurrence of these bursts with anything observable photographically or spectroscopically. In fact, the scientists felt impelled to demonstrate that the noise bursts did come from the sun after all. To show this they observed noise simultaneously at two different points one hundred sixty miles apart. The direction and intensity of the noise bursts was exactly the same at the two locations, effectively ruling out any terrestrial source of two hundred megacycle noise.

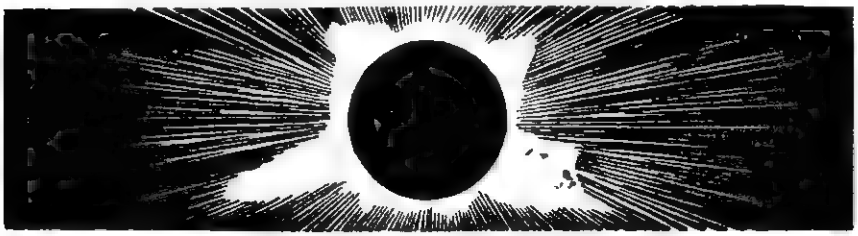
Another measurement gave much more interesting results. The short bursts were observed simultaneously at two hundred megacycles and also at six hundred megacycles. The variation of intensity with time was much the same in both cases, but the six hundred megacycle noise always arrived one or two seconds earlier than the two hundred megacycle noise! Remember, the higher the frequency, the more transparent the corona appears. At six hundred megacycles we see farther down into the corona than at two hundred megacycles. This suggests that the noise may be associated with some disturbance rising rapidly in the sun's corona. We see it first deep in the corona by means of its more penetrating six hundred megacycle radiation, and later high in the corona by means of its two hundred megacycle radiation. In fact, in observing the short bursts of noise we may be listening in on a solar prominence! We wonder then if we can't correlate these short bursts of noise with observable prominences, made visible nowadays by the coronagraph. Alas, the prominences we are most likely to get word of by radio are those toward the center of the sun's disk while the only ones we can see are those at the edge which will be pretty well shielded as far as radio goes by the sun's corona. The prospects aren't good. Perhaps the short bursts will give us more and surer news later.

There is one subject for speculation we haven't touched on yet. You'll remember that the *background* noise level due to the corona itself corresponds to around one million degrees at two hundred megacycles. But, the bursts of

radiation are one thousand to one million times as strong as the background. Surely, this can't mean that the sunspots and the prominences are that much hotter! As a matter of fact, Dr. Bowen has another suggestion. According to astronomers, there are very intense magnetic fields associated with sunspots and prominences, and these magnetic fields have just about the right strength to cause the electrons to whirl around two hundred million times a second. Perhaps we have a sort of solar magnetron, naturally contrived to radiate powerfully in just the frequency band Dr. Bowen chose to examine. As a matter of fact, some theoretical work has indicated that the magnetic fields present in the sunspots and prominences should produce maximum radiation at around five meters—sixty megacycles—and nothing much at wave lengths shorter than ten centimeters or longer than ten meters. So it seems that Southworth, who measured the sun's noise at wave lengths shorter than ten centimeters, and Jansky, who measured cosmic noise at fourteen meters, chose pretty dull frequencies as far as the sun goes. And, in picking two hundred megacycles, the Australian workers were very fortunate indeed.

Once one's started in such an interesting new field he'd hate to think there was no more to learn. By all indications, there's plenty more to learn from the radio-frequency noise of the sun. Only the broad outlines have been sketched in. Can the depth and nature, and the temperature distribution of the corona be explored in detail? Well, during the next total eclipse of the sun, visible in South America in May of 1947, an attempt will be made to measure the apparent diameter of the sun as observed by various radio frequencies. As the radio radiation comes from a part of the sun outside of the photosphere, the source of visible radiation, the sun should seem a little larger as seen by radio, and the period of totality should last a little shorter time than for light. Measurements of the period of totality at various radio frequencies may give quite a lot more information about the composition of the upper layers of the sun. What more may be found I don't know, but we can be sure that the ingenuity of Dr. Bowen and his Australian colleagues isn't going to fail them at this point

THE END.



ERRAND BOY

The essence of the problem was simply stated; where in blazes did the kid get that can of polka dot paint?

BY WILLIAM TENN

Illustrated by Cartier

Yes, I'm the Malcolm Blyn who phoned you from the village. Mind if I come in and take a seat—I won't take up much of your time? Thanks. Now, here's the story, and if you're the man I've been tearing the country apart for, there's a million in it—

No, please! I'm not selling goldmine stocks or a patent for an internal combustion atomic engine: I'm not selling anything. I'm a salesman all right — been one all my life and I know I look like a salesman right down to my bottom adjective — but today I'm not selling anything.

Today I'm buying.

If you have the stuff, that is. The stuff the errand boy said you or someone with your — Listen! I'm not crazy, believe me till you hear it all! Please sit down and listen. He wasn't an ordinary errand boy; he was an errand boy like Einstein is an accountant. The errands he ran! But you must understand . . . here, have a cigar.

Here's my card. *Blyn's Wholesale Paints and Painters' Supplies*—that's me — *Any Quantity of Any Paint Delivered Anywhere at Any Time.* Of course, by "anywhere" we mean the continental United States only. But it looks good on the card. Salesmanship.

That's me, a salesman. Give me something to sell: an improvement, a service or a brand-new crazy novelty gimmick — I guarantee to get people tearing the lining out of their pants pockets. I've always kept Emerson's famous wisecrack framed on my office wall, you know: "If a man can write a better book, preach a better sermon, or make a better mousetrap than his neighbor, though he builds his house in the woods, the world will make a beaten path to his door." Solid stuff. And I'm the guy that gets them interested in beating a path in the first place.

I'm good. I want you to understand that. I can put it over, whatever it is you've got—if only you're the guy that's got it. But I must have something to put over, something good. No hot air. No, I'm not accusing you of putting out the hot air. I don't know yet what you put out — raise chickens, mostly? Yeah. So listen.

Five weeks ago this coming Wednesday, we had a rush job. Three hundred gallons of flat white to the Expando Construction Corporation, an outfit I'd been trying to sell ever since they started up after the war. Eleven o'clock, and they wanted it delivered to their new development over in north Jersey by noon, so their men could start slapping it on the walls right after lunch.

I was out on the floor of the warehouse lighting a fire under Hennessey, my foreman, so he'd light a fire under his crew. Cans of paint were being stacked and shipped as fast as the bank says no to an extension of your loan, men were rolling this way, guys were hustling that way — when I heard Hennessey make a crack.

"Hey, that new errand boy's been gone a long time. Kid must have given up." About a dozen men stopped working and laughed for a while. They could see it was supposed to be funny — Hennessey was their boss.

"Since when do we have a new errand boy?" I stopped Hennessey in his tracks. "I do all the hiring and firing around here. Any new personnel have to go on the books—a dozen different ones these days. Do you want to get me into trouble? Haven't you ever heard of Social Security? Child Labor Laws? How old is the kid?"

"Aw, Mr. Blyn, how should I know? They all look alike to me. Maybe nine, maybe ten, eleven. A lot thinner than most kids I've seen, but a lot healthier. Looks — sorta rich."

"Well, if he's that young, he's got no business in the warehouse district this early in a weekday. Probably on the hook. I'll have the New York Board of Education on my neck as well as the working papers people. Don't I have enough trouble, Hennessey, with two road-happy truck drivers who use a Pennsylvania map

to get lost in New Jersey, without—"

"I didn't hire him, honest. He come around here asking for a job in that funny voice like kid stars have in the movies. He says he's willing to start at the bottom and prove himself, he feels he's bound to rise, he's got the will to win, all he wants is a chance. I tell him the way business has been lately, we wouldn't hire Alexander Graham Bell to run our switchboard. He says he doesn't care; he wants to get a foot on the ladder of success. He'll work for nothing."

"So?"

"So, I make out I'm thinking—at ten this morning, things were slow on the floor — and finally I say I'll give him a crack at trying out for errand boy. I hand him an empty can and say I want it filled with green paint — it should have orange polka dots. I'm testing him, see? He grabs the can and takes off. He won't bother us any more. You shoulda seen the guys after he left, Mr. Blyn: they fit to died."

"Hold me up," I said. "I'm getting weak myself. Almost as funny as the time you locked Whalen in the washroom with a stink bomb. That reminds me—you'll be taking orders from Whalen if your crew doesn't get that truck loaded and out of here in ten minutes."

He wiped his hands on his overalls and started to say something. Then he changed his mind and began yelling up and down the warehouse. He asked his men if they didn't think it was time to crawl out of their coffins, he told them to get their mass behind every dolly that wasn't being used, he got the place hissing where before it was only humming.

One thing about Hennessey: he might have been a practical joker from way back when he found all the amusing things you could do with diapers; but he was one crackerjack foreman. The way he made those monkeys hustle reminded me of the way I fit a fountain pen in a customer's hand just before he begins to purse his lips.

Then the kid walked in.

"Hey, Ernest," somebody yelled. "Look. Ernest's back."

Work stopped. The kid walked in, breathing hard, and set the can down in front of Hennessey. He was dressed in a white blouse, patched corduroy pants and high-laced brown shoes. But I'd never seen corduroy like that before, or that kind of white broadcloth in a shirt. The material seemed to be very thin — and, well, rich somehow. That's the only way to describe it. Like imitation iron.

"Glad you're back, kid," Hennessey told him. "I've been needing a left-handed paintbrush. Shop around and see if you can pick one up for me. But it must be left-handed."

A couple of characters on the loading platform started to chuckle. The kid started out. He turned at the big sliding doors.

"I'll try, sir," he said in a voice like he had a flute in his throat. "I'll do my best. But this paint—I couldn't find any green paint with orange polka dots. This only has red polka dots. I hope it will do."

Then he left.

For a moment we all stared at the patch of sidewalk where he'd been standing. Then I laughed; in a second the roars were bouncing off the second-story ceiling. The men just stood there with dollies and paint stacked on them, laughing their heads off.

"Hennessey, the wise guy!" someone yelled.

"All I could find was green paint with red polka dots!"

"Please, sir, I hope it will do. Wow!"

"Did that kid let you have it!"

"Poor Hennessey!"

Hennessey stood there, his great big fists hanging at his sides and no one to use them on. Suddenly he noticed the can of paint. He drew his right leg back and came tearing at it with a kick that would have sent it into Long Island Sound. Only he missed it. He just touched a corner of the can—rocking it enough to spill a drop—missed his footing and came smashing down on his sitting apparatus. The roars got louder as he scrambled to his feet.

In a second, the laughter had stopped cold and everyone and his brother was hustling again. Not a man in that warehouse wanted to attract Hennessey's attention after his joke had backfired.

Still chuckling, I strolled over and looked at the can. I wanted to see what junk the kid had used to fill it. Looked like water. The liquid in the can was mostly transparent, with little brown flecks floating around. Not paint, certainly — no kind I knew.

I glanced at the floor where a drop had been spilled when my foreman tried to kick the can.

I began strangling on a howl.

The junk the kid had used to fill the can — the junk had been green paint with red polka dots. *Red polka dots!*

No doubt at all: a little oval puddle dripped up to the side of the can: the warehouse floor now had a spot painted green with red polka dots. And this kid—this errand boy—this Ernest—had found it somewhere.

One thing I told you I can tell. Salability. I can tell the salable something in somebody else's dream at night when I'm sleeping on the other side of town. I can sniff it — but, you know all that. But do you know how salable that kind of paint would be? Sell it as a sure-fire novelty to manufacturers, sell it as a gimmick to guys who putter around their own home, sell it as a brand-new idea in design to interior decorators. It's a natural; it's a gold mine.

But I had to move fast. I picked up the can by the wire handle; I scuffed the paint spot carelessly with my foot. Luckily, it seemed to take a long time to dry: it mixed with the dust on the floor and lost its color. I walked out into the street where Hennessey was standing near the truck watching his crew load.

"What did you say that kid's name was? Ernest?"

He looked up. "Yeah," he brooded. "Ernest. Didn't give me his last name. But if he ever shows his wise puss around here—"

"O.K. I have an important business appointment. Take over until I get back and get that flat white out."

I turned and started in the direction the kid had gone. I knew Hennessey was staring at the can of paint I carried swinging from my left hand. He was wondering what I wanted with it, with the kid. Let him wonder, I told myself. Give Hennessey the curiosity; I'll take the profit.

I caught sight of the kid about three blocks away; he was going east, in the direction of the park. He stopped in front of a hardware store, thought a moment, walked in. By the time he came out again, I'd caught up with him. He was shaking his head unhappily.

We walked side by side for a while before he noticed me. I couldn't get over those clothes of his. Even the old-fashioned high shoes he was wearing weren't made out of anything I'd ever seen; the material hugged his foot like another layer of skin; it wasn't leather, I was sure of that.

"No luck?" I asked.

He jumped and stared a bit. Then he seemed to recognize the face as one of those that had been staring at him a while ago. "No. No . . . er, luck. The distributor said he was very sorry but he was just this moment fresh out of left-handed paintbrushes. Exactly what they all said when I asked them for the paint with the polka dots. I don't mean any offense, but . . . but this *is* an inefficient method of circulating goods."

I watched his face while he said that. Really meant every word of it. What a kid! I stopped and scratched my head. Should I come right out and ask him where he'd found the paint, or should I let him talk into the secret as most people will usually do?

He had turned pale and then began blushing. I didn't like to see that in a boy. That musical soprano voice was bad enough, his thinness for a kid his size—he was almost as tall as me—I could take; but a boy who blushed had evidently never met a real school bully.

"Look, Ernest," I began. I reached out and put my hand on his shoulder, you know, fatherly-like. Ernest, I—"

Zing! He jumped backwards as if I'd gone to work on his neck with a can opener. And blush! Reminded me of a bride who'd led a full life and was doing her rosy best to convince the groom's mother at the altar that she hadn't.

"Don't *do* that," he said, shaking himself all over.

Better change the subject. "Nice outfit, you've got there. Where did you get it?" Subtle, you know. Catch him off guard.

He looked down complacantly. "It was my costume in the school play. Of course, it was a little off-period, but I thought—"

His voice trailed away awkwardly like he'd just realized he was breaking a lodge secret. This thing had angles, all right.

"Where do you live?" I shot at him fast.

"Brooks," he came right back.

I thought that over. No, it couldn't be. "Brooks?"

"Yes, you know — Brooks. Or maybe it's Brooklyn?"

I stroked my chin, trying to work it out. He was shuddering again.

"Please," he said in that high voice. "Please. Do you have to skinge?"

"Do I have to what?"

"Skinge. Touch your body with your hands. In a public place, too. Spitting and belching are bad enough—though most of your people avoid it. But everyone—everyone is always skinging!"

I took a deep breath and promised him I wouldn't skinge. But if I wanted to see his hole card, I'd have to flip mine over first. "Look, Ernest, what I wanted to say . . . well, I'm Malcolm Blyn. I—"

His eyes widened. "The robber baron of the warehouse!"

"The *what?*"

"You own Blyn's Paints. I saw your name on the door." He nodded to himself. "I've read all the adventure stories. Dumas . . . no, Dumas isn't right . . . Alger, Sinclair, Capon. Capon's 'The Sixteen Salesmen,' there's one fully conscious book! I read it five times. But you wouldn't know Capon, would you? He wasn't published until—"

"Until when?"

"Until . . . until . . . oh, I can tell you. You're one of the ruling powers: you own a warehouse. I don't come from here."

"No? Where do you come from?" I had my own ideas on that. Some overeducated rich kid—a refugee, maybe, to account for his accent and slenderness.

"From the future. I shouldn't have done it; it may mean my being set back a whole responsibility group, but I just had to see the robber barons with my own eyes. Wolf bait! I wanted to see them forming pools, freezing out competitors, getting a corner on—"

"Hold the economics, Jackson! From the *future,* did you say?" This kid was getting too big for his corduroy britches. *Corduroy* britches?

"Yes. According to the calendar of this time . . . let me see, and this part of the world, it would be . . . oh, the year 5930. No, that's still another calendar. According to *your* calendar I came from 2169 A.D. Or is it 2170? 2169, I think."

I was glad he'd settled the point to his satisfaction. I told him so, and he thanked me. And all the time, I was thinking: if this kid's crazy, or if he's lying, how come paint that brushes out green with red polka dots? And how come his clothes? They hadn't been made in any factories I'd ever heard of. Check.

"This paint . . . that come from the future . . . from your time?"

"Well, the shops were all out of it, and I wanted to prove myself to Hennessey . . . he's a real swashbuckler, isn't he? I went home and probed the spirrillix, and finally I found—"

"What's this spirrillix deal?"

"The spirrillix—the rounded usicon, you know. Your American scientist Wenceslaus invented it just about this time. I *think* it was just about this time—I remember reading of the trouble he had getting it financed. Or was it this time? Yes, I think—"

He was starting another of those

debates with himself. I stalled him off. "O.K. What's the difference, a hundred years more or less. This paint: do you know how it's made, what's in it?"

"How it's made." He swung a high-booted foot around in a little circle and studied it. "Well, it's hydrofluoric acid, of course. Triple-blasted. Although the container didn't mention the number of times it had been blasted. I *assume* it was triple-blasted, though—"

"Sure, sure. What do you mean—blasted, triple-blasted?"

A mouthful of perfect white teeth flashed out as he laughed right up and down the scale. "I wouldn't know that! It's all part of the Schmootz Dejector Process—my conditioning is two whole responsibility groups behind the Schmootz Process. I may never even reach it if I do well enough in self-expression. And I like self-expression better than conditioning; I only have two hours now, but—"

He raved on and on about how he was persuading some committee or other to give him more self-expression; I concentrated on worrying. This wasn't so good. I couldn't expect to import much more of the paint from this kid's hunting ground; my only hope was analysis of the sample he'd given me. And with this hydrofluoric acid and triple-blasting deal that didn't look so good.

Figure it out. Man has had steel for a long time now. But take some heat-treated steel from the best factory in Gary or Pittsburgh back to the time of that chemist character Priestley. Even if he had a modern lab available and knew how to use the equipment in it, he wouldn't be able to find much useful information. He'd know it was steel maybe, and he might even be able to tell how much carbon, manganese, sulphur, phosphorus and silicon it contained in addition to iron—if someone gave him a briefing on modern elementary chemistry, that is. But how it had acquired its properties, where its elasticity and tensile strength came from—the poor guy wouldn't know from nothing. Tell him "heat-treatment," "inward combustion of the carbon," and all he'd be able to do is open and close his mouth like a fish in Fulton Market wondering what happened to all the water.

Or spun glass. They had glass way back in ancient Egypt. Shove some of that shiny fabric we have at them, though, even say it's *spun* glass. They'd say, "Yah, sure. Have another piece of pie."

So I had the paint. One can of it hanging from my sweaty little palm. But it looked like a one-shot proposition unless I could be foxy grandpa himself — or, considering the kid, foxy great-great-great-grandpa.

Standing in front of me was the greatest errand boy a greedy businessman ever saw. And let me tell you I'm greedy; I admit it. But only for money.

How to swing it? How to turn this kid's errands into nice, bulging mounds of green paper with lots and lots of zeros on them? I didn't want him to get suspicious or upset; I didn't want him to feel I was using him as the tool I intended using him as.

I had to be a salesman; I had to sell him a bill of goods. I had to get him running the errands right, with a maximum of profit to all concerned, especially me.

Carelessly, I started walking in the direction he'd been going. He swung along beside me. "Where's your time machine, Ernest?"

"Time machine?" His delicate face wrinkled. "I don't have any time ma— Oh! You mean the chrondromos. Time machine — what a thought! No, I sunk a small chrondromos for my own personal use. My favorite father is an assistant engineer on the main chrondromos—the one they use for field trips? I wanted to go unsupervised for this once, no carnuplicators or anything. I wanted to see the ragged but determined newsboys rising steadily to riches. I wanted to see the great, arrogant robber barons like yourself—perhaps, I thought, I might even come across a real economic royalist! And I might get involved in some great intrigue, some market manipulation where millions of small investors are closed down and lose their last shred of . . . what is it again? . . . margin?"

"Yeah, they lose all their margin. Where did you sink this . . . this chrondromos?"

"Not where—*when*. I sank it after school. I'm supposed to be having self-expression now, so it doesn't make much difference. But I hope I can get back before a Census Keeper winds a total."

"Sure you can. I wouldn't worry about it. Uh . . . can I use this chrondromos of yours?"

He laughed his scorn at my foolishness. "How can you? You have no conditioning, not even responsibility group two. No, you wouldn't know how to begin to unstable. I'll be glad to get back. Not that I haven't enjoyed myself. Wolf bait! To think I met a robber baron! This has been one fully conscious experience."

I dug into my tweed jacket and lit a baronial cigarette. "Guess you wouldn't have much trouble finding a left-handed paint brush."

"Well, it might be difficult. I've never heard of one before."

"One thing I was wondering." I flicked ashes elaborately onto the sidewalk. "Do you have anything that sees ahead in time?"

"A revolving distringulatrix, you mean? There's one at the main chrondromos. I don't know how it works; they don't allow anyone from responsibility group four near it—you have to be at least six or seven."

Nasty. It had looked good. I might be able to persuade the kid to ferry back and forth with a couple of more cans of paint—but it would never amount to much. Especially if I couldn't get an analysis that would enable me to produce the stuff with present day methods. But if I could get a gadget from the future—something I wouldn't have to sell, something I could make a million out of just by using it myself— Like a dingus for seeing into the future: predict race results, elections, sweepstake winners.

The dingus was there all right.

This revolving distringulatrix. But the kid couldn't lay his hands on it. Nasty, I tell you.

"What about books? Got any books lying around the house: chemistry books, physics texts, pamphlets on industrial methods?"

"I don't live in a house. And I don't study from books. Not chemistry or physics anyway. That's all handled by conditioning. I had six hours of conditioning last night—examinations are coming, you know."

My tongue knotted with the frustration of it. Millions of bucks walking next to me and I didn't know how to turn it into cash. Ernest had

evidently seen all he wanted to see of the present, at least temporarily —hadn't he seen a real, live, robber baron? — and he was heading home to mama and self-expression.

There must be an angle, somewhere!

"Where'd you plant your chrondromos? I mean, where's its other end come out?"

He waved ahead. "Behind a big rock in Center Park."

"Central Park, you mean. Mind if I tag along, watch you leave?"

He didn't. We padded across Central Park West and turned up a little unpaved path. I pulled a dry bough off a tree and switched it across my ankles; I just had to think of something before he took off. I began to hate the can of paint; it was light enough, but it looked like such a puny item to get out of the whole deal. Especially if it couldn't be analyzed.

Keep the kid talking. Something would turn up.

"What kind of government do you have? Democracy, monarchy—"

There he went laughing at me again! It was all I could do not to smash him across the face with the switch. Here I was losing fortunes right and left, and he thought I was making like a comic!

"Democracy! But you w uld think in political terms, wouldn't you? You have to consider your sick individuals, your pressure groups, your— No, we passed that stage long before I was born. Let me see, the last president they manufactured was a reversibilist. So I imagine you could say we are living in a reversibilism. An unfulfilled one, though."

That helped a lot. Solved everything. I sort of dropped down into a moony yearning for an idea, any kind of an idea. Ernest skipped along chattering about things with unpronounceable names that did unbelievable deeds. I thought unprintable words.

"—I get in responsibility group five. Then there are the examinations, not at all easy this time. Even the trendicle may not help."

I cocked an ear at him. "What's with this trendicle? What does it give out?"

"It analyzes trends. Trends and developing situations. It's really a statistical analyzer, portable and a little primitive. I use it to determine the questions I'll be asked in the examinations. Oh, I forgot — you probably have the scholarship superstitions of your period. You don't believe that the young should anticipate questions based on the latest rearrangements in the world, on the individual curiosities of their instructors. There it is!"

High up on a little wooded hill was a gray and careless rock formation. And, even at that distance, I could see a transparent, shimmering blue haze behind the largest rock.

Ernest beat it off the road and scurried up the hill. I choked after him. There wasn't much time; I had to think it out fast—this trendicle looked like the goods.

I caught up to him just as he reached the large rock. "Ernest," I wheezed, "how does your trendicle go?"

"Oh, it's simple. You punch all available facts into it—regular keyboard, you know—it analyzes them and states the only possible result or shows the trend the facts indicate. Built-in Skeebee power system. Well, good-by, Mr. Blyn."

He started for the blue haze where it was thickest on the ground. I wrapped my paw around his chest and pulled him back.

"There you go again. Skinging!" he wailed.

"Sorry, kid. The last time. How would you like to be in on a really big deal? Before you go back, you might like to see me get control of an international trust. I've been planning it for some time — one of the biggest bull markets. Wall Street has never seen my secret gilt-edged because I have a broker planted in Chicago futures. I'll hurry it along and do it today, just so you can see how we robber barons operate. The only thing is, this trendicle deal will make it sure-fire and I'll be able to do the whole thing much faster. What a spectacle! Hundreds of banks failing, I get a corner on synthetic rubber, the gold standard crashes, small investors frozen and down to their bottom margin! You'll see it all. And if you get the trendicle for me, why I'd let you handle the capitalization."

His eyes shone like brand-new dimes. "That would be fully conscious! Think of my getting involved in financial battle like that! But it's so risky! If a Census Keeper winds a total and finds I've been subtracted— If my guide catches me using a chrondromos illegally—"

I'm a salesman, I told you. I know how to handle people. "Suit yourself," I said, turning away and stepping on my cigarette. "I just thought I'd offer you the chance because you're a nice kid, a bright boy; I think you'll go far. We robber barons have a lot of pride, you know. It isn't every errand boy I'd trust with anything as important as capitalization." I made as if to walk away.

"Oh, please, Mr. Blyn!" He sprinted around in front of me. "I appreciate your offer. If only it weren't so dangerous— But danger —that's the breath of life to you, isn't it? I'll do it. I'll get you the trendicle. We'll rip the market open together. Will you wait?"

"Only if you hurry," I said. "I have a lot of manipulating to do before the sun goes down. Take off." I set the can of paint on the grass and crossed my arms. I swished the dry bough back and forth like the widget kings go in for—scepters.

He nodded, turned and ran into the blue haze just behind the rock. His body sort of turned blue and hazy, too, as he hit it; then he was gone.

What an angle! I mean, *what an angle.* You get it, don't you? This trendicle—if it was anything like the kid described it—could practically be used the way I said I was going to use it, in that fast double-talk shuffle I'd handed him. Predict movements of the stock market up and down — sideways even!; anticipate business cycles and industrial trends; prophesy war, peace and new bond issues. All I'd have to do would be to sock the facts into it — all the

financial news let's say of the daily paper — and out would come multitudes of moolah. Was I set.

I threw my head back and winked at a treetop. I sang,

"Mother had a baby,
His name was Malcolm Blyn;
She made of him a salesman
A fortune for to win!"

Honestly, I felt drunk. I must have been drunk. Because I'd stopped figuring. Just shows — never stop figuring. Never!

I wandered up to the shimmering blue haze and put my hand out toward it. Just like a stone wall. The kid had been giving me the straight goods on this conditioning deal.

He was a nice kid. Ernest. Nice name.

Nice.

The haze parted and Ernest ran out. He was carrying a long, gray box with a cluster of white keys set in one end. Looked like an adding machine that had been stretched.

I plucked it away from him. "How does it work?"

He was breathing hard. "My guide . . . she saw me . . . she called me . . . I hope she didn't see me go into the chrondromos . . . first time I've disobeyed her . . . illegal use of chrondromos—"

"Sure," I said. "Sure. Very sad. How does it work?"

"The keys. You punch the facts out on the keys. Like the ancient—like your typewriter. The resultant trend appears on the small scanner."

"Pretty small. And it'll take a terrifically long time to type out a couple of pages of financial news. Those stock listings, especially. Don't you people have anything that you just show the paper to and it burps out the result?"

Ernest looked puzzled. Then, "Oh, you mean an *open* trendicle. My guide has one. But it's only for adults. I won't get an open trendicle until responsibility group seven. With good leanings toward self-expression."

There he went on that self-expression gag. "Then that's what we need, Ernest. Suppose you trot back and pick up your guide's trendicle."

I've never seen so much shock on anyone's face in my life. He looked as if I'd told him to shoot the president. The one they just manufactured.

"But I told you! It isn't mine—it's my guide's!"

"You want to be in charge of capitalization, don't you? You want to see the greatest coup ever pulled in Wall Street — lambs fleeced, bears skinned, bulls broken? Go back to your guide—"

"You are discussing me?" A very sweet, very high voice.

Ernest twisted around. "Wolf bait! My guide," he fluted.

A little old lady in a nutty kind of twisted green dress was standing just outside the haze. She was smiling sadly at Ernest and shaking her head at me. I could tell the difference.

"I hope you are satisfied, Ernest, that this period of high adventure was in reality very ugly and peopled by individuals infinitely small. We've become a little impatient with the duration of your unstabling, however. It's time you returned."

"You don't mean — the Census Keepers didn't *know* all along that I was illegally using a chrondromos? They allowed me to do it?"

"Of course. You stand very high in self-expression; an exception had to be made in your case. Your involved and slightly retarded concepts of the romantic aspects of this era made it necessary to expose you to its harshness. We couldn't pass you into responsibility group five until you had readjusted. Come, now."

It was about time for me to break into the conversation. Between Ernest and the old lady, it sounded like a duet with fife and piccolo. Such voices!

"Just stay unstabled a second," I said. "Where do I come into all this?"

She turned hostile eyes to me. "I'm afraid you don't. We are removing it from you. The various items you have received from our time . . . you should never have gone so far, Ernest . . . will also be removed."

"I don't see it that way." I reached out and grabbed Ernest. He struggled, he had muscles in the strangest places; but I had no trouble holding on to him. I lifted the bough threateningly over his head.

"If you don't do just as I tell you, I'll hurt the boy. I'll . . . I'll skinge all over him!" Then I had an inspiration. "I'll demobilize him! I'll fragisticate every last bone in his body."

"Just what do you want?" she asked very quietly in that thin voice.

"That trendricle you have. The one without keys."

"I'll be back shortly." She turned with a tinkle of the green dress and faded back into the chrondromos. Just like that.

One of the neatest deals I'd ever swung. Just like that! And guys work for a living.

Ernest writhed and twisted and shuddered, but I held him. I wasn't letting him go, no sir! He represented millions of dollars.

The blue haze shimmered again and the old lady stepped out. She carried a circular black thing with a handle in the center.

"Now, that's more like—" I started to say as she pulled the handle.

And that was all. I couldn't move. I couldn't even wiggle the hairs in my nose. I felt like my own headstone.

The kid darted away. He picked up the small trendricle where I'd dropped it on the grass and ran to the old lady. She reached up with her free hand. She was speaking to him:

"A definite pattern, Ernest. Selfishness, cruelty, little wisdom. Avarice without the faintest signs of a social—" Her hand came down and the blue haze disappeared. I bounded forward, but there was empty air behind the rock. As if they'd never been there.

Not quite.

The can of paint still sat on the ground where I'd parked it. I chuckled and reached for it. There was a sudden flicker of blue.

The can disappeared. A musical voice said, "Ooops. Sorry!"

I whirled. Nobody there. But the can was gone.

For the next half hour, I almost went crazy. All that stuff I could have had. All the questions I could have asked and didn't. All the information—money-making information—I had missed.

Information. Then I remembered. Wenceslaus. The kid had said someone named Wenceslaus had invented the spirrillix about this time; had a lot of trouble financing it. I don't know what it is: maybe it stuffs ballot boxes; maybe it enables you to scratch your left elbow with your left hand. But whatever it is, I made up my mind right then, I'm going to find it and sink every penny I have into it. All I know about it is that it's some sort of gimmick; it does things—and it does them good.

I got back to my office and began hiring detectives. You see, I'd already figured that it wouldn't be enough to check phone listings—my Wenceslaus of the spirrillix might not have a phone. He might not even call the gadget a spirrillix; that could be the name Ernest's people fastened on it.

Well, I didn't go into detail with the detectives. I just told them to find me people named Wenceslaus or close to it, anywhere in the country. I interview them myself. I have to tell them the whole story, so they'll get the feel of the thing, so they'll be able to recognize the spirrillix if they've invented it.

That's where you come in, Mr. Wantzilotz. Anyone with a name so close can't be missed. Maybe I didn't hear Ernest right; maybe the name was changed, later.

Now you've heard the story. Think, Mr. Wantzilotz. Are you working on anything besides raising chickens? Are you inventing anything, improving on anything—

No, I don't think a homemade mousetrap is quite what I want. Have you written a book, maybe? Thinking of writing one? Developing a new historical or economic theory—the spirrillix might be anything! You haven't.

Well. I'll be going. You don't have any relatives of the same name who fool around with tools and stuff—no? I've got a lot of people to visit. You'd be amazed at the number of Wenceslauses and variations there are—

Wait a minute. Did you say you'd made—you'd invented a new mousetrap? Hm-m-m.

Here, have another cigar. Sit down. Now tell me, this mousetrap of yours — just how does it work? It catches mice, yes. But what does it *do?*

THE END.

* * * * *

FURY

BY LAWRENCE O'DONNELL

***Second** of three parts. Sometimes, when a race is slipping slowly into the long, easy twilight toward extinction, a ruthless crook can be a savior—a furious, lying, cheating, totally amoral egomaniac—*

Illustrated by Orban

SYNOPSIS

Sam Harker was born six hundred years after the Earth's destruction by an atomic chain reaction. Man didn't die when Earth did. There were survivors, and they fled to Venus—which was uninhabitable. The cataclysmic fury of semi-Jurassic, nonterrestrial flora and fauna forced the race to retreat to the great impervium domes that were constructed on the sea bottom —the Keeps. There mankind lived —and slowly began to die.

Atomics had changed the race. The majority were short-boned, heavy, and fleshy. But there was a sprinkling of mutants, Immortals as they were called—the powerful Families of the Keeps who had a life-expectancy of more than seven hundred years. Physically they were variants from the norm; they were long-boned, lean, tall, unmistakably Immortals.

Last of the great Harker Family was Blaze Harker. His wife should have known better than to have a child; she was not built for child-bearing. She died when Sam Harker was born. And Blaze, blindly, insanely hating his son for that reason, took revenge. The

Keeps had their underworlds and their darker technologies. When Blaze's father, Zachariah Harker, and his grandfather and great-grandfather tried to locate the boy, they failed. Blaze would not tell them what he had done, and the Harker heir, with his heritage of nominal immortality—was gone.

An underworld technician, well paid by Blaze, worked on Sam. Endocrine surgery. The baby's physical pattern was altered. He was made hairless, and, when he grew larger, he would be short-boned, heavy, and fleshy. He would not know his real name. He would be Sam Reed.

He grew up in the Keep underworlds, learning the underworld codes. The Slider tutored him, a fat old Chiron-Fagin wise in his sinful ways. Sam Reed learned. . .

Love between Immortals has many facets. Zachariah Harker, Sam's grandfather, and Kedre Walton took long vacations from their love, but inevitably they swung together again. Until, when Sam was forty, Kedre saw him at Keep Carnival, and was drawn to him by some quality she could not analyze. Perhaps she sensed that he was an Immortal, though she did not know it, and neither did Sam, who was simply a racketeer, promoter, and operator of whatever seemed most profitable.

He wasn't apparently impressed by an Immortal's favors. He was willing, but not eager. For Sam had been a have-not all his life, and automatically he resented the Immortals—Zachariah, too, when he met him, though he undertook a certain commission Zachariah offered him.

There —were two reasons Zachariah made this offer. Kedre was too interested in Sam, and Sam could be got rid of fairly easily after he had fulfilled his task and killed Robin Hale. Hale was a nuisance. He was organizing a plan to colonize the lands of Venus, and the Families felt that such an attempt would not only be bound to failure at this time, but it would weaken the Keeps for future attempts. Hale was a malcontent. An Immortal, he had been one of the Free Companies that existed for centuries on Venus, hired mercenaries subsidized by the Keeps to fight their wars for them without running risks themselves. The Companies were gone now, but Hale lived on, a purposeless adventurer. He found his purpose when he visited the Temple of Truth and met the Logician, the oracle everyone thought was a thinking-machine.

The Logician, as Hale learned, was simply an Immortal with a curious talent—he knew all the right answers. It wasn't prescience; it was simply a talent for truth. He advised Hale to colonize landside. . .

Instead of killing the Free Companion, Sam joined forces with Hale. He saw his opportunity. He was a crook and a promoter. He convinced Hale that he could promote the Colony venture, in the

face of the Families' opposition. By propaganda and publicity, Sam succeeded. The people of the Keeps rose to the glamorous bait of landside colonization. The funds began to pour in.

Sam quietly sold three hundred per cent of the stock. It would make his fortune—if the Colony failed. It couldn't succeed, he knew—landside was uninhabitable.

Rosathe, a Keep dancer, dropped into his arms with other triumphs. He had wanted her for a long time. Now he had her, and he was winning his fight against the strangely passive Immortals—proving that he, a short-termer, was as good as they were—

Then Kedre and Zachariah struck, using Rosathe as their tool. Sam did not know what had happened until he smelled the terrifying scent of the dream-dust Rosathe puffed into his nostrils. And after that he woke, quite suddenly, in a Keep alley. Dream-dust could put a man to sleep for a long time.

How long?

A passer-by gave him the answer. "The Colony? Oh, the Land Colony! You're a little late. It's been open a long time now—what's left of it."

"How long? How long?"

Sam heard the answer, and found himself hanging on the bar of a vending machine and looking at his face in the mirror. His face hadn't aged. Not a bit. And that was impossible.

Because he had been drugged—under dream-dust—for forty years.

Part II

And indeed there will be time
For the yellow smoke that slides along the street,
Rubbing its back upon the window panes;
There will be time, there will be time
To prepare a face to meet the faces that you meet;
There will be time to murder and create,
And time for all the works and days of hands
That lift and drop a question on your plate. . .

—T. S. Eliot

The city moved past him in a slow, descending spiral. Sam Harker looked at it blankly, taking in nothing. His brain was too filled already to be anything just now but empty. There was too much to cope with. He could not yet think at all. He had no recollection to span the time between the moment when he looked into his impossibly young face in the glass, and this current moment. Under his broken soles he felt the faint vibration of the Way, and the city was familiar that moved downward beneath him in its slow sweep, street after street swinging into view as the spiral Way glided on. There was nothing to catch hold of and focus, no way to anchor his spinning brain.

"I need a shot," he told himself, and even the thought came clumsily, as if along rusty channels where no thought had moved before in

forty drugged years. But when he tried his ragged pockets, he found them empty. He had nothing. No credits, no memory, not even a past.

"Nothing?" he thought foggily. "Nothing?" And then for the first time the impact of what he had seen in the mirror struck him hard. *"Nothing? I'm immortal!"*

It could not be true. It was part of the dream-dust fantasy. But the feel of his own firm cheek and hard, smooth neck muscles beneath his shaking fingers—that was no fantasy. That was real. Then the idea of forty years gone by must be the unreality. And that man at the alley-mouth had lied. Looking back now, it seemed to Sam that the man had looked at him oddly, with a more than passing interest. He had assumed the man was a passer-by, but when he forced his rusty brain to remember, it seemed to him that the man had been standing there watching him, ready to go or to stay according to the cue Sam's conduct gave him.

He groped for the memory of the man's face, and found nothing. A blur that looked at him and spoke. But looked with clinical interest, and spoke with purpose and intent beyond the casual. This was the first coherent thought that took shape in the dimness of Sam's brain, so the stimulus must have been strong. The man must have been there for a reason. For a reason concerned with Sam.

"Forty years," Sam murmured. "I can check that, anyhow."

The city had not changed at all. But that was no criterion. The Keeps never changed. Far ahead, towering above the buildings, he saw the great globe of dead Earth in its black plastic pall. He could orient himself by that, and the shapes of the streets and buildings fell into familiar place around him. He knew the city. He knew where he was, where his old haunts had been, where that lavish apartment had looked down over these glittering ways, and a girl with blue eyes had blown dust in his face.

Kedre's face swam before him in the remembered screen, tears in the eyes, command in the gesture that brought about his downfall. Kedre and Rosathe. He had a job to do, then. He knew Kedre's had not really been the hand behind that poison dust, any more than Rosathe's had been. Zachariah Harker was the man who gave the orders here. And Zachariah would suffer for it. But Kedre must suffer too, and as for Rosathe —Sam's fingers curved. Rosathe he had trusted. Her crime was the worst—betrayal. Rosathe had better die, he thought.

But wait. Forty years? Had time done that job for him already? The first thing he must learn was the date of this day on which he had awakened. The moving street glided toward one of the big public newscast screens, and he knew he could check the date on that when it came into view. But he thought he did not really need to. He could *feel* time's passage. And though the city had not changed,

the people had, a little. Some of the men near him were bearded, so that much was new. Clothes had a more extreme cut than he remembered. Fashions change in rhythm with changing social orders, not meaninglessly but in response to known patterns. He could work it out from that alone, he thought, if his mind were clearer and there was no other way to learn.

The Way swung round slowly so that a corner of the newscast screen loomed into view, and Sam noticed how few faces around him turned toward it. He could remember a time when every neck craned and people jostled one another in their hurry to read the news a little faster than the moving Way would let them. All that was over now. Apathy in direct and easily understood contrast to the extreme new styles showed upon every face. Sam was the only one here who craned to see the big screen.

Yes, it had been forty years.

There was something like a bright explosion in the center of his brain. Immortality! Immortality! All the possibilities, all the dangers, all the glories lying before him burst outward in one blinding glow. And then the glow faded and he was afraid for a moment of maturity's responsibilities —this new, incredible maturity so far beyond anything that he had ever dreamed of before. And then the last doubts he would feel about this wonderful gift assailed him, and he searched his memory frantically for knowledge of some drug, some treatment that could produce a catalepsy like this, ageless over a span of forty years. He knew of none. No, it must be real. It could not be, but it was true.

It would wait. Sam laughed dryly to himself. This of all things would most certainly wait. There were more urgent things to think of. Something magical had happened to him, and the result was forty years of sleep and then immortality. But what had that something been?

Dream-dust. The remembered fragrance of it was still in his nostrils, and there was an ominous dry thirst beginning to assert itself beneath his tongue, a thirst no liquid would assuage.

I've got to get cured. First of all, I've got to get cured.

He knew dream-dust. It wasn't incurable, but it was habit-forming. Worse than that, really, because once you went under the deadly stuff you didn't come out again. There were no rational periods during which you could commit yourself for cure. Not until the organism built up antibodies, and that took almost a lifetime. Even then the dream-dust virus could mutate so rapidly that the rational term didn't last. You dropped back into dreams, and eventually, you died.

Panic struck Sam for a moment. How long would this rationality last? How long had it lasted already? At any time now would the dusty dreams strike again and his newly emerged identity go

under? Immortality was useless if he must sleep it all away.

He had to get cured. The thirst mounted now as he recognized it for what it was, a darker thirst than the average man ever knows. The cure took money. Several thousand korium-credits, at least. And he had nothing. He was rich beyond dreams of avarice if this immortality meant what he believed it meant, but the wealth of his endless years might vanish in any instant now because he had no material wealth at all. Paradox. He owned centuries of the future, but for lack of a few current hours he might be robbed of his treasure laid up in time.

Panic was no good. He knew that. He forced it down again and considered very quietly what he had to do. What he had to learn. How to go about it. Two things were paramount—his immortality and his dream-dust addiction.

Money.

He hadn't any.

Immortality.

That was an asset quite apart from the future it promised, but he didn't yet know how to spend it most wisely. So—keep it a secret.

How?

Disguise.

As whom?

As himself, of course. As Sam Reed, but not Sam Reed Immortal. Sam as he should have looked at the age of eighty. This tied in with the money angle. For the only way to get money was to return to his old haunts, his oldest practices. And he must not throw away his most precious secret there. Already a dim stirring in his brain hinted at the wonderful use he might make of this secret. Time enough for that later. Time in spilling-over plenty, if he could salvage it soon enough.

But first, a little money, a little knowledge.

Knowledge was easier and safer to acquire. It came first. He must learn immediately what had been happening in the past four decades, what had happened to himself, whether he had dropped out of the public attention, when and how. Clearly he was no longer a public figure, but where he had been the past forty years was still a question.

He stepped off onto a cross-Way and let it carry him toward the nearest library. On the way he considered the problem of money. He had been a very rich man when Rosathe blew the dream-dust in his face. Some of the credits were in his own name, but four caches privately hidden held most of the fortune. It seemed likely that at least one still remained secret, but whether he could collect the money in any identity but his own remained to be seen. That had waited forty years—it would wait a few hours longer.

He had not even the few cents required to buy the privacy of a room or a booth at the library, but he seated himself at one of the long tables and bent forward, hiding his face between the sound-

absorbent wings that jutted out from the middle-partition. He lowered his eyes to the viewpiece of the visor. He touched control buttons and waited.

A general newscast forty years old unrolled itself on the magnified screen below him. It was a weekly summary that covered the last seven days he could remember.

Rip van Winkle could have helped his own disorientation by reading a twenty-year-old newspaper. It wouldn't have told him what had happened since he slept, but it would have restored the firmness of the world he woke in. In all the Keep, in all the planet, this odd newscast was the only thing that could have put solidity under Sam Reed's feet. Outside the library danger and unfamiliarity waited everywhere, because the frames of reference had changed so much.

The little things change most—fads, fashions, slang—and lapses from that superficial norm are instantly noticed. But a lapse from a basic can often remain undetected.

Sam watched the past unroll which seemed so vividly the present that he could almost smell dream-dust puffed freshly in his face from Rosathe's hand. When he thought of that the dryness of his thirst suddenly choked him, and he remembered anew how urgent his need for haste was. He pressed his forehead to the viewpiece and sped the roll faster.

SAM REED DREAM-DUSTS! The thin voice from the past shrilled ghostlike in his ears while the tri-di pictures moved swiftly by. *Sam Reed, promoter behind the Land Colony, today gave up his career and dream-dusted, amazing everyone who knew him . . . found wandering through the city . . .*

It was all there. The investigation that followed his apparent suicide, the scandal as his swindle began to emerge. Four days after Sam Reed disappeared, after a dozen reputable witnesses saw him under the influence of dream-dust, the Colony bubble burst.

Robin Hale, the Free Companion, had no answer to make. What could he say? Three hundred per cent of the stock had been sold, speaking louder than any words of the fact that the Colony's promoters had known it could not succeed. Hale did the only thing he could do—tried to weather the storm as he had weathered so many in his long lifetime, man-made storms and the violent tornadoes of landside. It was impossible, of course. Emotions had been strung too high. Too many men had believed in the Colony.

When the bubble burst, little remained.

Sam Reed's name bore the brunt of the opprobrium. Not only was he a swindler, but he had run out—given up completely and lost himself in the suicidal escape of dream-dust. No one seemed to wonder why. There was no logic behind such a step. But publicity-wise minds behind the telling of

the story wasted no time that might give people a chance to think the thing out. If the Colony was foredoomed to failure, Sam had only to wait to collect his illicit three hundred per cent in safe secrecy. His suicide might have argued that he feared the Colony would succeed—but no one thought of that. It seemed only that, fearing exposure, he took the quickest way out.

Investigation followed him, backtracked and discovered the caches of swindled money that he hadn't concealed quite cleverly enough. Not against the deductive technology of the Keeps and the Immortals. They found the caches and emptied them—all of them. There had been four. The old newscasts gave details.

Sam leaned back and blinked in the dim air of the library. Well, he was broke, then.

He could see the hands of the Harker Family moving behind this four-decade-old game. Zachariah's face came back to him like something seen an hour ago, smooth and smiling in the visor screen, remote as a god's face watching ephemeral mortals. Zachariah had known exactly what he was doing, of course. But that was only the start of the game. Sam was a pawn to be used and discarded in the opening move. He turned back to the newscast to learn how the rest of the moves had been carried out.

And he was surprised to find that Robin Hale went ahead and started the Land Colony, in the face of the lack of all popular support—in the face of actual enmity. He had only one weapon. He still had the granted charter, and they couldn't take that away from him, especially since the money Sam stole had been recovered. Doggedly Hale must have forged ahead, laying his long-term plans as the Families laid theirs, looking forward to the time when these petty scandals would have blown past and he could start anew with a fresh generation and fight the Families to win this generation over as he had won the last—for a while.

Yes, the Colony was started. But remarkably little news had been recorded about it. There was a spectacular murder in Delaware Keep and then a new play was produced that had all undersea Venus scrambling for tickets, and presently Sam found week after week of newscast spinning by with only the briefest references to the fact that a Colony had been started at all.

That was deliberate, of course. The Harkers knew what they were doing.

Sam stopped the newscast and thought. He would have to rearrange his tentative plans, but not much. He still needed money—fast. He swallowed dryly against the drug-thirst. The cached money was gone. What remained? Only himself, his experience, his priceless secret that must not yet be squandered—and what else? The old land charter issued in his name forty years ago was still on file, he assumed, since the charters were irrevocable. He couldn't claim it in his own name, and in any other

name it would be invalid. Well, deal with that later.

Right now—money. Sam's lips tightened. He got up and left the library, walking lightly, seeking a weapon and a victim. He couldn't get two or three thousand credits by robbery without taking long risks, but he could manage a simple black-jacking up an alley for twenty or thirty credits—if he was lucky.

He was lucky. So was the man he stunned, whose skull didn't crack under the impact of a sock filled with pebbles. Sam had taken careful stock of himself, and was surprised to find that physically he seemed to be in better shape than he had any right to expect. Most dream-dust victims are skin-and-bone mummies by the time they die. It raised another mystery—what sort of life had he been leading during these forty dreaming years?

Memory of the men in the alley where Sam woke returned bafflingly. If he had only been clear-headed enough to keep his grip on that collar until he could shake the information he needed out of the watcher who had stood waiting above him. Well, that would come, too, in its time.

With forty-three credits in his pocket, he headed for a certain establishment he had known forty years ago. The attendants there kept their mouths shut and worked efficiently, in the old days, and things did not change fast in the Keeps. He thought they would still be there.

On the way he passed a number

of big new salons where men and women were visible being embellished to a high point of perfection. Apparently the demand had increased. Certainly more foppery was evident in the Keep now. Men with exquisitely curled beards and ringlets were everywhere. But privacy and discretion were necessary to Sam's purpose. He went on to his semi-illegal establishment, and was not surprised to find it still in business.

His nerve shook a little as he paused before the entrance. But no one had recognized him on the Ways, apparently. Forty years ago his televised face had been thoroughly familiar in the Keeps, but now—

Rationalization is a set pattern in men's minds. If they looked at him and saw familiarity, they decided automatically that it was a remarkable likeness, no more. The unconscious always steers the conscious toward the most logical conclusion—the one grooved by channels of parallel experience. Sometimes striking resemblances do occur; that is natural. It was not natural to see Sam Reed as he had looked forty years before, moving along a Way. And many of those he passed had been unborn at the time of the Colony fiasco, or had seen Sam Reed with the indifferent eyes of childhood. Those who might remember were old now, dim-sighted, and many faces in public life had superimposed themselves on these failing memories since then.

No, he was safe except for random chance. He went confidently through the glass door and gave his orders to the man assigned to him. It was routine enough.

"Permanent or temporary?"

"Temporary," Sam said, after a brief pause.

"Quick-change?" There was a call for emergency quick-changes of disguise among the establishment's clientele.

"That's right."

The artist went to work. He was an anatomist and something of a psychologist as well as a disguise expert. He left Sam's pate bald, as directed; he dyed and bleached the red brows and lashes to pepper-and-salt that could pass for either dark or light, depending on the rest of the ensemble. With the beard, they passed for grimy white. The beard was a dirty, faded mixture.

He built up Sam's nose and ears as time would have built them had it touched Sam. He put a few wrinkles in the right places with surrogate tissues. The beard hid most of Sam's face, but when the artist had finished eighty years of hard living looked out above its grayish mask.

"For a quick change," he said, "take off the beard and change your expression. You can't remove the surrogate quickly, but you can iron out those wrinkles by the right expression. Try it, please." He wheeled Sam's chair around to the mirror and made him practice until both men were satisfied.

"All right," Sam said finally. "I'll need a costume."

They settled on three things only

—hat, cloak, shoes. Simplicity and speed were the factors behind the choice. Each item was a special article. The hat could be completely altered in shape by a pull and a twist. The cloak was opaque, but of a texture so thin it could be crumpled and stuffed into a pocket. It was weighted to hang straight when worn, to hide the fact that the body beneath was not an old man's body. Sam had to practice the proper gait. And the shoes were nondescript in color, like the hat, but their large, dull buckles could be opened to release puffy blue bows.

Sam went out by a back way. Moving stiffly, like one who felt the weight of his eighty years, he returned to the library. He was a remarkably well-preserved eighty, he concluded, watching his reflection in windows as he passed, a hale and hearty old man, but old—old. It would do.

Now he wanted to study the current crime news.

In a way the criminal classes are agrarian—if you look at them over a span as broad as Sam's. They move as they feed, drifting from pasture to greener pasture. The Blue Way had been a skid-row forty years ago, but no more, Sam realized, listening to reports from the telecast. As for the crimes themselves, they hadn't altered much. That pattern was basic. Vice, through the ages, changes less than virtue.

Finally he located the present green pasture. He bought a vial of water-soluble red dye and a high-powered smoke bomb. The instructions on the bomb told how to use it in hydroponic gardens to destroy insect pests. Sam didn't read them; he had used these bombs before.

Then he had to locate the right place for his trap.

He needed two alleys, close together, opening on a Way not too well-traveled. In one of the alleys was a cellar Sam remembered. It was deserted now, as in the old days. He hid near the entrance several fist-sized chunks of metal he had picked up, and he made a hiding place for the smoke-bomb in the cellar. After that he was ready for the next step.

He did not let himself think how many steps the stairway contained altogether. When he thought of that, he remembered that he had all the time he needed—now!—and that sent him into drunken, elated dreams far divorced from the immediate necessity of redeeming his future. Instead, he reminded himself of his drug-addiction and the need for money and curative treatment.

He went to the current green pasture and drank rotgut whisky, the cheapest available. And he kept in mind always the fact that he was a very old man. There were little tricks. He remembered never to fill his lungs with air before speaking; old men are short of breath and their voices lack resonance. The result was convincing. Also he moved slowly and carefully, making himself think of each move before he made it. A hobble doesn't

indicate age, but action that is the result of old thought-processes does indicate it. The old have to move slowly because it's necessary to consider whether the stiff legs and weak muscles can manage obstacles. The world is as dangerous to the very old as to the very young, but a baby doesn't know the peril of gravity.

So Sam didn't creak or hobble. But he didn't seem to have much breath and he apparently wasn't conditioned to fast moving any more—and it was an old man who sat in Gem o' Venus drinking rotgut and getting quietly drunk.

It was a dive. A colorful dive, just as many of the dives of Imperial Rome must have been, the jetsam of costumes and customs drifting down from the higher levels, so that the eye caught here and there the flash of a gilded belt, the blood-brilliant scarlet of a feather-pierced cap, the swirl of a rainbow cloak.

But basically Gem o' Venus was for drinking and gaming and more sordid uses. In the upper levels men gambled with fantastic devices, tricky so-called improvements on the ancient games of chance. There you might encounter such dubious streamlined tricks as roulette which employed a slightly radioactive ball and Geiger counters; there you had the game of Empire with its gagged-up cards and counters, where men played at winning imaginary galactic empires.

In Gem o' Venus there were some gadgety games too, but the basics remained constant—dice and cards. Faces were not familiar to Sam here, but types were. Some of the customers didn't care where they sat; others always faced the door. These interested Sam. So did a card game on the verge of breaking up. The players were too drunk to be wary. Sam picked up his drink and kibitzed. After a while he slid into the game.

He had rather surprised to find that the cards they were using were not the familiar pipped and face-cards of the old days. They were larger, patterned with the esoteric pictures of the tarot. The old, old cards of Earth's cloudy past had been drifting back into favor in Sam's earlier life, but it was a little surprising to find they had reached such depths as these in forty years.

He had chosen these players carefully, so he was able to win without making it obvious, though the cards were distracting enough to lend verisimilitude to his game. It was confusing to play with pentacles and cups instead of diamonds and hearts, though, when you thought of it objectively, no more exotic.

These stakes weren't high, but Sam didn't expect to make his killing here. Cards were too uncertain, in any case. He needed only enough money to make an impression, and he managed to put over the idea that he had quite a lot more tucked away in his pockets. Shabbiness was no criterion of a man's financial status in this fluctuating half-world.

He let the game break up presently, protesting in his thin old voice. Then he made his way slowly

out of Gem o' Venus and stood considering, letting himself sway a trifle. To the man who followed, it must have appeared as though libation had induced libration.

"Look, grandpa—want to sit in on another game?"

Sam gave him a wary glance. "Floater?"

"No."

Sam was pleased. The backer of a floating game might be too penny-ante for his needs. He let himself be talked into it, remaining obviously wary until he found the destination wasn't a dark alley, but a third-rate gambling-and-pleasure house he remembered as a restaurant forty years past.

He was steered into poker, this time with more familiar cards. Playing against sober men, he tried no tricks, with the result that he lost what money he had and ended up with a stack of ships he couldn't pay for. As usual, Sam Reed had sold three hundred per cent of his stock issue.

So they took him to a man named Doc Mallard, a short, neckless man with curly fair hair and a face bronzed with scented skin-oil. Doc Mallard gave Sam a cold look. "What's this about? I don't take IOU's."

Sam had the sudden, strange realization that forty years ago this man had been a raw kid, learning the angles that he himself had mastered long before that. He knew a queer moment of toppling, almost frightening psychological perspective, as though, somehow, he looked down at Mallard from the enormous height of years. *He was immortal—*

But vulnerable. He let the drunkenness die out of his voice, but not the age. He said, "Let's talk privately." Mallard regarded him with a shrewdness that made Sam want to smile. When they were alone he said deliberately, "Ever hear of Sam Reed?"

"Reed? Reed? Oh, the Colony boy. Sure. Dream-dust, wasn't it?"

"Not exactly. Not for very long, anyhow. I'm Sam Reed."

Mallard did not take it in for a moment. He was obviously searching his memory for details of that long-ago scandal of his boyhood days. But because the Colony bubble had been —unique in Keep history, apparently he remembered after a while.

"Reed's dead," he said presently. "Everybody knows—"

"I'm Sam Reed. I'm not dead. Sure, I dream-dusted, but that can be cured. I've been landside for a long time. Just got back."

"What's the angle?"

"Nothing's in it for you, Mallard. I've retired. I just mentioned it to prove I'm good for my IOU's."

Mallard sneered. "You haven't proved a thing. Nobody comes back rich from landside."

"I made my money right here, before I left." Sam looked crafty.

"I remember all about that. The government found your caches. You haven't got a penny left from *that.*" Mallard was goading him.

Sam made his voice crack. "You

call seventy thousand credits nothing?" he cried in senile anger.

Mallard grinned at the ease with which he was trapping the old fool.

"How do I know you're Sam Reed? Can you prove it?"

"Fingerprints—"

"Too easy to fake. Eyeprints, though—" Mallard hesitated. Clearly he was of two minds. But after a moment he turned and spoke into a mike. The door opened and a man came in with a bulky camera. Sam, on request, looked into the eyepiece and was briefly blinded. They waited in silence, a long time.

Then the desk-mike buzzed before Mallard. Out of it a tinny voice said, "O.K., Doc. The patterns check with the library files. That's your man."

Mallard clicked the switch and said, "All right, boys, come on in." The door opened and four men entered. Mallard spoke to them over his shoulder. "This is Sam Reed, boys. He wants to give us seventy thousand credits. Talk him into it, will you?"

The four moved competently toward Sam Reed.

Third-degree methods hadn't changed much. Here along Skid Row you depended on the basic, physical pain, and generally it worked. It worked with Sam. He stood it as long as an old man might, and then broke down and talked.

There had been one bad moment when he was afraid his beard would come off. But the artist knew his business. The surrogate tissue stuck firm and would continue to do so until Sam used the contents of the bottle in his pocket, the bottle that looked like the stub of a stylus.

Breathing short and hard, he answered Doc Mallard's questions.

"I had—double cache. Opened with a korium key—"

"How much?"

"One point . . . one point three four—"

"Why haven't you got that seventy thousand before now?"

"I just . . . just got back from landside. They'd found—all the other caches. All but that—and I can't open it without the korium key. Where can—I get that much korium? I'm broke. Seventy thousand creidts—and I can't buy the key to open the lock!" Sam let his voice break.

Mallard scratched his ear.

"That's a lot of korium," he said. "Still, it's the safest kind of lock in the world."

Sam nodded with an old man's eager quickness at the crumb of implied praise. "It won't open—without the exact amount of radioactivity—focused on the lock. I was smart in the old days. You've got to know just the right amount. Can't stand the exposure—hit-or-miss. Got to know—"

"One point three four, eh?" Mallard interrupted him. He spoke to one of his men. "Find out how much that would cost."

Sam sank back, muffling his smile in his beard. It was a cold smile. He did not like Mallard or Mallard's methods. The old, familiar anger with which he had lived his forty

earlier years was beginning to come back—the familiar impatience, the desire to smash everything that stood in his path. Mallard, now—he curled his fingers in the depths of his cloak, thinking how satisfying it would be to sink them into that thick bronze-oiled neck.

And then a strange new thought came to him for the first time. Was murder satisfactory vengeance—for an immortal? For him other methods lay open now. He could watch his enemies die slowly. He could let them grow old.

He played with the idea, biding his time. Time—how much of it he had, and how little! But he must take it step by step, until he could use his immortality.

One step at a time he went with the gang to the cache.

One stiff, eighty-year-old step at a time.

In the cellar, Sam reluctantly showed Doc where to expose the korium key. Korium was U233—activated thorium—and definitely not a plaything. They didn't have much of it. Not much was needed. It was in a specially-insulated box, just too big to fit in a man's pocket, and Doc had brought along a folding shield—the only protection necessary against a brief one-time exposure. He set it up at the spot Sam indicated.

There were four men in the cellar besides Sam—Doc Mallard and three of his associates. They were all armed. Sam wasn't. Outside, in the alley, was another man, the lookout. The only preparation Sam had been able to make was to seize an opportunity to rub the "defixer" liquid into the roots of his beard. That appendage would come off at a tug now.

It was so silent the sound of breathing was very audible. Sam began taking long breaths, storing the oxygen-reserve he would probably need very soon. He watched Mallard's careful adjustment of the shield and the korium box, which looked like an old-fashioned camera, and, like a camera, had a shutter and a timing attachment.

"Right here?" Mallard asked, jabbing his finger at the plastibrick wall.

Sam nodded.

Mallard pressed the right button and stepped back, behind the shield. *Click—click!*

That was all.

Sam said hastily, "The cache is over here, where I said. Not by the lock." He stumbled forward, reaching, but one of the men caught his shoulder.

"Just show us," he said. "There might be a gun stashed away with the dough."

Sam showed them. Mallard tested the loose brick with his fingertips. He exhaled in satisfaction.

"I think—" he began—and pulled the brick toward him.

Sam drew a long breath and kept his eyes open just long enough to see the smoke-cloud begin to explode outward from the cache. With the tail-end of his glance he made certain of the korium box's location. Then he moved.

He moved fast, hearing the sound

of startled voices and then the explosive *sssssh-slam* of a gun. The beam didn't touch him. He felt the sharp corners of the korium box against his palm, and he bent and used his free hand to pull another loose brick from the wall. The korium went into this emergency cache, and the brick slipped back easily into its socket.

"Hold your fire!" Mallard's voice shouted. "Head for the door. *Pollard!* Don't come in here! Stop Reed—"

Sam was already at the door and had opened his eyes. He could see nothing at all in the thick smoke that was billowing across the threshold, but he could hear a plaintive query from the lookout—Pollard. He crouched, searching for the jagged lump of metal he had planted here. It was gone. No—he touched it; his fingers curled lovingly around the cold, hard alloy, and he brought his arm up and back as, through the thinning edges of the smoke, he saw Pollard.

The man's gun was out. Sam said, "Where's Reed? Did he—"

That was enough. It made Pollard's finger hesitate on the trigger button, as he tried to make certain of the identity of the vague figure emerging from the smoke. Sam's weapon was already poised. He smashed it into Pollard's face. He felt the crunching of bone and the wet, warm splattering of blood, and he heard a muffled, choking bleat as Pollard arched backward and began to fall. Sam hurdled the body before it struck. He ran fourteen feet and whipped around the corner. Instantly he snatched off his cloak and beard. They went into his pockets, making no noticeable bulges. He was still running. He tore off his hat, twisted it deftly, and thrust it back on his head. It had a new shape and a different color. He dropped to the pavement and spun around, facing in the direction from which he had come. Two hasty motions opened the buckles on his shoes so that the bright bows leaped out, disguising them. There was no need for the surrogate red dye; he had blood on his hand—not his own. He wiped this across his mouth and chin.

Then he twisted his head and looked behind him, until he heard thudding footsteps.

Doc Mallard and one of his associates burst out of the alley mouth. They paused, staring around, and, as they saw Sam, sprinted toward him. Another man came out of the alley and ran after Mallard. His gun was out.

Sam dabbed feebly at his chin, blinked, and made a vague gesture behind him. He said, "Wh . . . what—" His voice wasn't senile any more.

The fourth man came out of the alley. "Pollard's dead," he called.

"Shut up," Mallard said, his mouth twisting. He stared at Sam. "Where'd he go? The old man—"

"That passage up there," Sam said, pointing. "He—bumped into me from behind. I . . . my nose is bleeding." He dabbed experimentally and eyed his wet fingers. "Yes. That passage—"

Mallard didn't wait. He herded

his men on and turned into the alley Sam had indicated. Sam glanced around. The Way wasn't crowded, but one man was coming crosswise toward Sam.

He got up and waved the good Samaritan back. "It's all right," he called. "I'm not hurt." Wiping the blood from his face, he started to walk away.

He turned back into the alley from which he had emerged. There was no special hurry. Mallard would be chasing an old man, and feeling certain he could overtake the slow-moving octogenarian. Later he would return to the cellar, but not immediately, Sam decided.

Smoke was still billowing out. He stumbled over Pollard's body, and that gave him the location of the door. Inside the cellar, he oriented himself in the darkness and then found the loose brick. He pried it out, removed the korium box, and replaced the brick. Carrying the korium, he went out, and thirty seconds later was on the fastest Way-strip, moving rapidly away from Doc Mallard and company.

What next?

Korium was negotiable. But not on a no-questions-asked basis. This loot would have to be disposed of through illegal channels. Sam was no longer recognizable as the old man who had bilked Mallard. Nevertheless, he dared not appear in this transaction—not until he had fortified his position. Mallard would be watching for an underground korium sale, and he would check back.

What channels would have remained unchanged after forty years?

The same ones—but administered by different individuals. That was no help, since in such transactions it was vital to know the right people. The right ones wouldn't be at the top any more—after forty years. Except, of course, the Harkers—the Immortal families. Sam grimaced and licked his lips, conscious again of the dry thirst under his tongue.

Who, then?

He rode the Ways for three hours, increasingly furious at this simple, easy problem that had him stopped cold. He had swindled Doc Mallard out of several thousand credits. He had the korium under his arm. But he had lost all his contacts.

Hunger grew, and thirst grew. He had no money at all. He had lost it all at the gaming table. To be distracted by such a trivial matter as hunger was infuriating. He was an Immortal!

Nevertheless Immortals could starve.

These petty details! There was so much to do, so much he could do now—an endless road opening down for his feet—and he couldn't do a thing till he got cured of the dream-dust addiction.

So, groping, he came at last to the one man who had stood *in loco parentis* to him many years before.

It was not surprising that the Slider still lived in the same dingy apartment in a corner of the Keep.

What was surprising was the fact that the Slider still lived.

Sam hadn't expected that. He had expected it so little, unconsciously, that he hadn't put on his disguise again.

The Slider was in bed, a monstrously corpulent figure sagging the mattress, his dropsical face bluish. He sniffed painfully. His malevolent little eyes regarded Sam steadily.

"All right," he wheezed. "Come on in, kid."

The room was filthy. In the bed the old man puffed and blinked and tried to prop himself upright. He gave up the impossible task and sank back, staring at Sam.

"Give me a drink," he said, breathlessly.

Sam found a bottle on the table and uncapped it. The invalid drank greedily. A flush spread over the sagging cheeks.

"Woman never does anything I tell her," he mumbled. "What you want?"

Sam regarded him in distance and amazement. The monstrous creature seemed almost as immortal as the Immortals themselves, but a Tithonian sort of immortality that no sane man would covet. He must be close to a hundred years old now, Sam thought, marveling.

He stepped forward and took the bottle from the Slider's lax hand.

"Don't do that. Give it back. I need—"

"Answer some questions first."

"The bottle—let's have it."

"When you've told me what I want to know."

The Slider groped among his dirty bedding. His hand came out with a needle-pistol half engulfed by the flesh. The tiny muzzle held steady on Sam.

"Gimme the bottle, kid," the Slider said softly.

Sam shrugged and held it out, feeling reassured. The old man hadn't quite lost his touch, then. Perhaps he had come to the right place, after all.

"Slider," he said, "do you know how long since you saw me last?"

The shapeless lips mumbled a moment. "Long time, son. Long time. Thirty—no, close on to forty years, eh?"

"But—you knew me. I haven't changed. I haven't grown older. And you weren't even surprised. Slider, you must have known about me. *Where have I been?*"

A subterranean chuckle heaved the great wallowing bulk. The bed creaked.

"You think you're real?" the Slider demanded. "Don't be a fool. I'm dreaming you, ain't I?" He reached out and patted an opalescent globe the size of a man's fist. "This is the stuff, kid. You don't need to feel any pain no matter what ails you, long as you got Orange Devil around."

Sam stepped closer, looking down at the bright powder in the globe.

"Oh," he said.

The Slider peered up at him out of little shrewd eyes in their fat creases. The eyes cleared a bit as they stared. "You're real, ain't

you?" he murmured. "Yes, I guess you are. All right, son, now I'm surprised."

Sam eyed the orange powder. He knew what it was, yes. A drug of sorts, weakening the perception between objective and subjective, so that a man's mental images and ideations became almost tangible to him. The hope that had roused for a moment sank back in his mind. No, he was not likely to learn from the Slider where he had spent that vanished forty years.

"What's happened to you, Sam?" the Slider wheezed. "You ought to be dead long ago."

"The last thing I remember is having dream-dust blown in my face. That was forty years ago. But I haven't changed!"

"Dream-dust—that don't keep you young."

"Is there anything that will? Any sort of preservation at all that could have kept me—like this?"

The bed heaved again with the enormous chuckling of the sick man.

"Sure," he said. "Sure! Get yourself born of the right stock—you live a thousand years."

"What do you mean?" Suddenly Sam found that he was shaking. Until now he had had no time to reason the thing out. He awoke, he was young when he should have been old—ergo, he was immortal. But how and why he had not yet considered. Out of some unconscious well of sureness, he had assumed that like the long-limbed Immortals, he, too, was the heir of a millenium of life. But all Immortals until now had been slender, tall, fine-boned. . .

"You've always been bald?" the Slider asked obliquely. At Sam's mystified nod he went on. "Might of been sickness when you were a baby. Then it might not. When I first knew you, you had a few little scars here and there. They're mostly gone now, I see. But the Slider's smart, kid. I heard some talk a long time ago—didn't connect it with you till now. There was a woman, a medic, who did some work on a baby once and got herself a happy-cloak for pay."

"What kind of work?" Sam asked tightly.

"Mostly glands. That give you any ideas?"

"Yes," Sam said. His voice was thick. His throat felt tight and the blood throbbed in his temples and his neck. He took two forward steps, picked up a plastic chair and broke it across his knee. The tough plastic broke hard, cutting his hands a little, bruising his knee. The final snap as the chair gave way was satisfying. Not enough, but satisfying. With a tremendous effort he choked back his useless rage. fettering it as Fenris Wolf was fettered, to bide its time. Carefully he set down the chair and faced the Slider.

"I'm an Immortal," he said. "That's what it means. I'd have grown up like them if . . . if someone hadn't paid that medic. Who paid her?"

A vast seismographic shrug rippled the bedding. "I never

heard." The Slider wallowed restlessly. "Give me another drink."

"You've got the bottle," Sam pointed out. "Slider—forget about this immortality. I'll take care of—everything. I came to you about something else. Slider, have you still got your contacts?"

"I'm still with it," the Slider said, tilting the bottle.

Sam showed him the box he had taken from Mallard's men. "This is korium. I want two thousand credits. Keep all you get above that. Make sure the transaction can't be traced."

"Hijacked?" the Slider demanded. "Better give me a name, so I can play it close."

"Doc Mallard."

The Slider chuckled. "Sure, kid. I'll fix it. Shove that visor over here."

"I'm in a hurry."

"Come back in an hour."

"Good. One thing more—you're the only one who knows I'm young." Sam pulled the ragged beard from his pocket and dangled it.

"I get it. Trust the Slider, kid. See you in an hour."

Sam went out.

At the hospital he would have to give a name. Would they recognize him as the old-time Colony swindler? Someone might. His eye-pattern records were on file, so must his other identifying marks be recorded. The average man, seeing a baffling familiarity in Sam, would chalk it up to some accidental re-

semblance. But in the sanitarium he would be under much closer observation. Too close to maintain the octogenarian disguise—that was certain.

Suddenly it occurred to Sam that there was one man who could very logically resemble him and yet seem the age he looked now.

His own son.

He had none, it was true. But he might have had. And everyone knew that short physique weren't Immortal, couldn't tap the fountain of youth. He could preserve his precious secret and get by with a minimal disguise as Sam Reed's son.

What name? Out of the depths of his omnivorous reading in those years which still seemed hardly an hour ago he dredged up the memory of the prophet Samuel, whose eldest son was Joel. *Now the name of his first-born was Joel.*

As good a name as any. He was Joel Reed. . .

Thirty-five minutes after that he stood before the hospital reception desk, shocked into immobility with surprise, able only to stare, while the circuits of his brain tried frantically to close their contacts again. But the disorientation was too abrupt and complete. All he could do was stand there, repeating stupidly, "What? What did you say?"

The competent young man behind the desk said patiently, "We discharged you as cured early this morning."

Sam opened his mouth and closed it. No sound came out.

The young man regarded him thoughtfully. "Amnesia?" he suggested. "It hardly ever happens, but—do you want to see one of the doctors?"

Sam nodded.

"Six weeks ago," the man in the quiet office said, "you were brought here for the regulation cure. A man who gave the name of Evans delivered you and signed you in. He gave us no permanent address—said he was a transient at one of the hotels. You can try to trace him later if you like. The fee was paid anonymously, by special delivery, just before you arrived. You seemed in good physical condition on admission." The doctor referred again to the ledger page before him. "Apparently adequate care had been taken of you while you were dream-dusting. You were discharged this morning. You seemed quite normal. Another man called for you—not the same one, though he gave the name of Evans, too. That's all I can tell you, Mr. Reed."

"But"—Sam rubbed his forehead dazedly—"why have I forgotten? What does it mean? I—"

"There are a good many amnesic preparations on the underworld market, unfortunately," the doctor said. "You left here in a suit of good clothes, with a hundred credits in your pocket. Did you wake with them?"

"No. I—"

"You were probably robbed."

"Yes, I . . . of course that was it." Sam's eyes went blank as he

thought of the many ways in which a man might be rendered unconscious—a puff of dust in the face in some alleyway, a crack on the head. Robbers rarely bothered to stuff a stripped victim into their own discarded rags, but aside from that the story was plausible enough.

Except for that man who had been waiting when he woke.

He got up, still slightly dazed. "If I could have the address the Evans man gave you—"

It would lead nowhere, he knew, looking down on the scrawled slip as the moving Way glided slowly beneath him, carrying him away from the hospital. Whoever was responsible for the chain of mysteries which had led him here would have covered any tracks efficiently.

Someone had fed him dream-dust forty years ago. Zachariah Harker—that much he knew. Kedre Walton gave the signal, but Zachariah was the man behind her. *The voice is Jacob's voice, but the hand is the hand of Esau.*

Had Harker watched over him these forty years? Had Kedre? Someone did a careful job of it, according to the doctor. Someone paid to have him cured at last, and discharged—and robbed and stripped, so that when he woke he possessed materially as little as he had possessed when he came into the world.

Less—for then he came with a birthright. Well, of that they had not cheated him after all. And if there were a Joel Reed, Sam realized with a sudden gust of pride, he would stand head and shoulders above his father, on long, straight legs, slender and elegant as Zachariah himself—an Immortal in body as well as in heritage.

The stretching of his mind was almost painful as he surveyed the years before him. And when he thought now of the Slider he saw him through a new temporal perspective that was almost frightening. It was oddly similar to the attitude he might have toward a cat or a dog. There was always, and there must always be from now on, the knowledge that the life-span of an ordinary man was too short.

No wonder the Families had formed a tight clique. How could you feel deep friendship, or love untouched by pity, except for an equal? It was the old, old gulf between gods and men. Nothing—immortal—was alien.

That didn't solve his current problem. He was here on sufferance—by grace of somebody's indulgence. Whose? If only he had kept his grip on the collar of that man in the alley until his own wits returned to him! Someone had deliberately redeemed him from oblivion and set him free, penniless and in rags—why? To watch what he would do? It was a godlike concept. Zachariah? He looked around hopelessly at the uninterested crowds that moved with him along the Way. Did one of these faces mask an absorbed interest in his behavior? Or had his unknown guardian tired of the

burden and set him on his own feet again, to go his own way?

Well, in time he would know. Or he would never know.

One excellent result of the past few hours was the money in his pocket, two thousand credits, free and clear. He had hurdled the next step without realizing it. Now there were a few old scores to settle, a few details to attend to, and then— Immortality!

He refused to think of it. His mind shrank from the infinite complexities, the fantastic personal applications of his new, extended life. Instead, he concentrated on the two men named Evans who had shepherded him to and from the hospital. The Slider would start investigations on those—he made a mental note. Rosathe. The Slider would be useful there, too. Other things he would attend to himself.

His throat was dry. He laughed to himself. Not the pseudo-thirst of dream-dust, after all. He had simply played a trick on himself. Water could have quenched his thirst at any time, had he allowed himself to believe it. He stepped off the Way at the nearest Public Aid station and drank cool water, freshly cold, ecstatically quenching, until he could drink no more.

He looked up at the brightness of the Way, the towering buildings beyond, twinkling with lights, and something within him began to expand, growing and growing until it seemed the Keep could not contain this strange new vastness. He stared up at the impervium dome and pierced the shallow seas above it, and the clouds and the twinkling void beyond which he had never seen. There was so much to do now. And no need to hurry. He had time. All the time in the world.

Time to kill.

His bones are full of the sin of his youth, which shall lie down with him in the dust. Though wickedness be sweet in his mouth . . .

—Job

He turned from his contemplation of the city and into the arms of the two men in uniform who had come up behind him on the Way platform. The uniforms had not changed—they were private government police and Sam knew before a word had been uttered that there was no point in trying to argue.

In a way he was rather more pleased than otherwise as the older of the two flashed an engraved placque at him and said, "Come along." At least, someone else had finally made a tangible move. Perhaps now he would learn the answers to some of the questions that had been tantalizing him.

They took him along the high-speed Ways toward the center of the Keep. People glanced curiously at the three as the city flashed past around them. Sam held the railing to keep steady, aware of an unaccustomed flutter around his face as his red wig blew in the wind of their speed. He was

watching with interest and anticipation the destination toward which they seemed headed.

The Immortals of every Keep lived in a group of high, colored towers built at the city's center and guarded by a ring of walled gardens. The police were taking Sam straight toward the tall, shining quarters of the Harker Family. Sam was not surprised. It seemed unlikely that Zachariah would have ordered his ruin forty years ago and then let him wander unguarded for the next forty. On the other hand, it seemed unlikely that Zachariah would have let him live at all. Sam shrugged. He should know the truth, soon.

They took him in through a small door at the back of the highest tower, down transparent plastic steps under which a stream of gray water flowed toward the gardens beyond. Red and gold fish went by with the stream, a long blue ribbon-eel, a strand of flowering seaweed.

At the foot of the steps a small gilded lift was waiting. The two policemen put Sam into it, closed the door without a word behind him. He had a glimpse through the glass of their impassive faces sliding down outside; then he was alone in the gently sighing cage as it rose toward the height of the Harker tower.

The lift's walls were mirrored. Sam considered himself in the role of Joel Reed, feeling rather foolish about it, wondering whether whoever it was that waited him above knew him already as Sam Reed. The disguise was good. He couldn't look exactly like his supposed father, but there was a naturally strong likeness. A red wig matched the heavy red brows, trimmed and smoothed a little now. A set of tooth caps altered the contour of his lower face. There were eye shells with bright blue irises instead of gray. Nothing else.

The eye shells served the same psychological purpose as dark glasses—unconsciously Sam felt himself masked. He could look out, but nobody could look in. It is difficult to meet a straight stare, unprotected, when you have something to hide.

The pressure on Sam's soles decreased; the lift was slowing. It stopped, the door slid open and he stepped out into a long hall whose walls and ceiling were a constant rustle of green leaves. A glow of simulated daylight poured softly through them from luminous walls. The vines sprang from hydroponic tanks under the floor and met in a trellislike tunnel overhead. Flowers and fruit swayed among the leaves in a scented, continuing breeze that soughed down the arbor. To a Keep-bred man it was exotic beyond all imagining.

Sam went warily down the silent hall, shrinking a little from the leaves that brushed his face. Like all Venus-bred people he feared and mistrusted by instinct the dangerous products of the landside world.

From the other end of the hall came the pleasant tinkle and splash of falling water. Sam paused on

the threshold of the room upon which the trellis opened, staring in amazement.

This room was an arbor, too. Vines looped down festooned with clustering blossoms; the air was heavy with their fragrance. And the floor of the room was water. Blue water, a shallow lake of it perhaps a foot deep, filling the room from wall to wall. Flowers mirrored themselves in its surface, other flowers floated upon it. Tiny fish darted among their drifting leaves. A luminous jellyfish or two lay motionless on the blue water, dangling dangerous-looking jeweled webs.

There was a bridge of filigreed glass, insubstantial-looking as frost, that spanned the pool. One end lay at Sam's feet, the other at a low platform, cushion-covered, on the far side of the room. A woman lay face-down among the cushions, elbow on the edge of the pool, one arm submerged to the elbow as she splashed in the shining water. Her hair hid her face, its curled ends dipping in the ripples. The hair was a very pale green-gold, wholly unreal in its color and its water-smooth lustrousness.

Sam knew her. The long lines of Kedre Walton's body, her leisured motions, the shape of her head and her hands, were unmistakable even though the face was hidden. Why she should be here in the Harker stronghold, and why she had summoned him, remained to be seen.

"Kedre?" he said.

She looked up. Sam's mind spun dizzily for an instant. It was Kedre—it was not. The same delicate, narrow, disdainful face, with the veiled eyes and the secret Egyptian mouth—but a different personality looking out at him. A m a l i c i o u s, essentially unstable personality, he thought in his first glimpse of the eyes.

"No, I'm Sari Walton," the pale-haired woman said, smiling her malicious smile. "Kedre's my grandmother. Remember?"

He remembered. Sari Walton, leaning possessively on Zachariah's shoulder long ago, while Zachariah spoke with him about the murder of Robin Hale. Sam had scarcely noticed her then. He searched his memory quickly—antagonism was what returned to it first, antagonism between Sari and Kedre, submerged but potent as the two beautiful women watched each other across the table with mirror-image faces.

"All right," he said. "What does that mean?" He knew well enough. Joel Reed could not be expected to remember a scene in which Sam Reed had figured. She knew who he was. She knew, then, that he, too, was immortal.

"Come here," Sari said, gesturing with a dripping white arm. She sat up among the cushions, swinging her feet around beneath her. Sam looked dubiously at the glass bridge. "It'll hold you. Come on." Derision was in Sari's voice.

It did, though it sang with faint music at the pressure of every step. At Sari's gesture he sank hesitantly to a seat among the cushions beside her, sitting stiffly, every angle

of her posture rejecting this exotic couch, this fantastic, water-floored bower.

"How did you locate me?" he demanded bluntly.

She laughed at him, putting her head to one side so that the green-gold hair swayed between them like a veil. There was something about her eyes and the quality of her laughter that he did not like at all.

"Kedre's had a watch out for you for the past forty years," she said. "I think they traced you through an inquiry at the library archives about your eye patterns today. Anyhow, they found you—that's all that matters, isn't it?"

"Why isn't Kedre here now?"

Again she laughed, that faintly malicious laughter. "She doesn't know. That's why. Nobody knows but me."

Sam regarded her thoughtfully. There was a challenge in her eyes, an unpredictable capriciousness in her whole manner that he could not quite make up his mind about. In the old days he had known one solution for all such problems as that. He reached out with a quick, smooth gesture and closed his fingers about her wrist, jerking her off balance so that she fell with an almost snakelike gracefulness across his knees. She twisted, unpleasantly lithe in his grasp, and laughed up at him derisively.

There was a man's aggressive sureness in the way she reached up to take his cheek in the cup of her palm and pull his head down to hers. He let her do it, but he made the kiss she was demanding a savage one. Then he pushed her off his knee with an abrupt thrust and sat looking at her angrily.

Again she laughed. "Kedre's not such a fool after all," she said, running a delicate forefinger across her lip.

Sam got to his feet, kicking a cushion out of the way. Without a word he set his foot on the ringing bridge and started back across it. From the corner of his eye he saw the serpentine twist with which Sari Walton got to her feet.

"Conie back," she said.

Sam did not turn. An instant later he heard a hissing past his ear, felt the searing heat of a needle-gun's beam. He stopped dead still, not daring to stir for fear another beam was on the way. It was. The hiss and the heat stung his other ear. It was fine shooting—too fine for Sam's liking. He said without moving his head, "All right, I'm coming. Let me hear the gun drop."

There was a soft thud among the cushions and Sari's laughter sounded almost as softly. Sam turned on the narrow bridge and went back to her.

When they were standing like this he had to tip his head back to look into her eyes. He did not like it. He liked nothing about her, least of all her air of self-confident aggressiveness which from time immemorial has belonged to man, not woman. She looked as fragile as the frost-patterned bridge, as delicately feminine as the most

sheltered woman alive—but she was an Immortal and the world belonged to her and her kind. There had been generations of time for her to set in this pattern of malice and self-assurance.

Or—had there been? Sam squinted at her thoughtfully, an idea beginning to take shape in his mind that blotted everything else out for a moment. In contrast to Kedre, this beautiful, fragile creature seemed amazingly immature. That was it—immaturity. It explained the capriciousness, the air of experimental malice he had sensed in her. And he realized that for the Immortals maturity must be a long, long time in forming fully. Probably he himself was very far from it, but his early training had hardened him into the accepted pattern of a normal adult.

But Sari—sheltered and indulged, wielding almost godlike powers—it was no wonder she seemed unstable in these years before her final matrix of centuries-old maturity had set. It would never set quite properly, he thought. She was not essentially a stable person. She would never be a woman to like or trust. But now she was more vulnerable than she knew. And one of Sam's devious schemes for making use of an adversary's weakness started to spin a web in his mind.

"Sit down," Sam told her.

She lifted both hands over her green-gold head to pluck a cluster of pale fruit like grapes that dangled from a vine. Sam could see her cradling fingers through them, they were so nearly transparent, the blue seeds making a pattern of shadows inside the tiny globes. She smiled at him and sank to her knees with her unpleasantly boneless litheness.

Sam looked down at her. "All right," he said. "Now. Why did you get me up here? If Kedre sent the orders out, why isn't she here instead of you?"

Sari put a pale, glassy globe into her mouth and bit down on it. She spat out blue seeds. "Kedre doesn't know, I told you." She looked up at him under heavy lashes. Her eyes were a paler blue than Kedre's. "The warrant's been out for forty years. She's in Nevada Keep this week."

"Has she been notified?"

Sari shook her head, the lustrous, improbable hair swinging softly. "Nobody knows but me. I wanted to see you. If Zachariah knew he'd be furious. He—"

"Zachariah ordered me dream-dusted," Sam broke in impatiently, eager to get the story clear in his head. "Was Kedre behind it?"

"Zachariah ordered you poisoned," Sari corrected, smiling up at him. "He meant you to die. Kedre said no. They had a terrible quarrel about it." Her smile grew secret; she seemed to hug herself with a pleasant memory. "Kedre made it dream-dust," she went on after a moment. "No one could understand why, really. You wouldn't be any use to her after that, alive or dead, young or old." Her voice failed gently; she sat

with a transparent fruit between thumb and finger halfway to her lips, and did not move for a long second.

Sam had a sudden, dazzling idea. He dropped to his knees before her and put a finger under her chin, turning her head toward him, looking into her eyes. And a surge of triumph made his throat close for an instant.

"Narco-dust!" he said softly. "I'll be damned! Narco-dust!"

Sari gurgled with laughter and leaned forward to rub her forehead against his shoulder, her eyes glazed with that strange luminous luster which is unmistakable in the addict.

It explained a great deal—her instability, her curious indifference, the fact that she had not yet quite realized Sam's strange youth. How odd, he thought—and how significant—that the two people he had met who remembered him from long ago were both under a haze of drug-induced dreams.

Sari pushed him away. She put the fruit in her mouth without knowing her gesture had been interrupted, and spat out the seeds and smiled at him with that sharp, glittering malice that had no reason behind it. Of course his inexplicable youth had not struck her. She was quite accustomed to see unchanging faces about her as the decades went by. And under narco-dust a serene, unquestioning acceptance of all one sees is a major factor. But at any moment now she might have a flash of clarity. And Sam still had much to learn.

"Kedre substituted dream-dust for the poison," he said. "Did she have someone guard me after that?"

The greenish hair spread out like a shawl as Sari shook her head.

"She meant to. Zachariah fixed that, I think. Kedre always thought he did. You'd disappeared when her men went to look for you. You've been missing ever since—until now. Where were you, Sam Reed? I think I could like you, Sam. I think I see now what was in Kedre's mind when she sent her people out to find you and cure you. I—"

"What are you doing here, in the Harker house?"

"I live here." Sari laughed, and then an ugly timbre crept into the laughter and she closed her delicate, long-fingered hand suddenly over the cluster of fruit. Colorless juice spurted through her fingers. "I live here with Zachariah," she said. "He wants Kedre. But if he can't have her—I'll do instead. Some day I think I'll kill Zachariah." She smiled again, sweetly enough, and Sam wondered if Zachariah knew how she felt about him, and that she was a narco-addict. He rather doubted it. The combination was dynamite.

He was beginning to realize what a ripe plum of opportunity had dropped into his lap—but an instant later the familiar doubt crept in. How opportunely had it dropped, after all? How much reasoned planning lay behind all that had

happened to him since he woke? There was still no explanation of the watcher in the alley. And that man had known what he was doing. There was no drug-dream behind the precise pattern of what had so far happened to Sam Reed.

"Why did you send for me?" he demanded. Sari was splashing her hand in the water to wash away the sticky juice. He had to ask her twice before she appeared to hear him. Then she looked up and smiled her bright, vacant smile.

"I was curious. I've been watching Kedre's private visor for a long time now. She doesn't know. When word came in that they'd found you I thought I'd see . . . I thought I could use you. Against Kedre or against Zachariah—I'm not sure yet. After awhile I'll think about it. Not now. I'm thinking about Zachariah now. And the Harkers. I hate the Harkers, Sam. I hate all Harkers. I even hate myself, because I'm half a Harker. Yes, I think I'll use you against Zachariah." She leaned forward, brushing Sam's shoulder with a fan of green-gold hair, looking up at him with a pale-blue flash under the heavy lashes.

"You hate Zachariah too, don't you, Sam? You should. He wanted you poisoned. What do you think would hurt him most, Sam? I think for Kedre to know you're alive—and young. Young?" Her narrow brows drew together in brief bewilderment. But that was a subject that required thought, and she was in no condition now to attack serious problems. Her mind was not working except in its deepest levels at this moment, the primitive levels that move automatically, without conscious effort.

Suddenly she threw back her head and laughed, choked on the laughter, looked at Sam with swimming eyes. "It's wonderful!" she said. "I can punish them both, can't I? Zachariah will have to wait until Kedre's tired of you, now that you're alive again. And Kedre can't have you if she doesn't know where you are. Could you go away and hide, Sam? Some place where Kedre's men couldn't find you? Oh, please, Sam, do go and hide! For Sari. It would make Sari so happy!"

Sam rose. The bridge rang musically as he crossed it, a series of faint, sweet undernotes to Sari's laughter. The scented breeze blew in his face as he went back down the trellised hall. The lift stood waiting where he had left it. There was no one in sight when he came out at the foot of the shaft and went back up the glass steps over the swimming stream and into the street.

Moving almost in a daze, he stepped onto the nearest Way and let it carry him at random through the city. The episode just past had all the qualities of a dream; he had to focus hard upon it to convince himself it had happened at all. But the seed of a great opportunity lay in it, if he could only isolate what was important.

The Harkers had a weakness they did not suspect—Sari. And beyond that lay implicit an even deeper weakness, if Sari was really a Harker, too. For she was definitely not a normal person. The narco-dust and the possible immaturity of her mind explained only partly that shuddering instability at the very core of her being. It opened new vistas for Sam's thought. So even Immortals were not wholly invulnerable, even they had hidden weaknesses in the fabric of their heritage.

There were two secret paths now by which he might ambush Zachariah. The paths would need exploring. That must come later.

Just now the most important thing was to hide while he thought things over. And the more he considered this, the more inclined Sam felt to visit the Colony where Robin Hale administered his sterile jurisdiction.

Hale would probably shoot him on sight. Or would he, as Joel Reed? No one knew Sam yet except Sari, but who could guess what wild caprices might move her between now and the time he was face to face with Hale? He had better act fast.

He did.

The most striking thing about the Colony was that it might just as well have been undersea.

At no time since Sam Reed had left the Keep was the open sky ever above his head. First there was the Keep's impervium dome and above that a mile of water. Then the plane, with its alloy and plastic shell. After that, the great Colony locks, with their safeguards against infection—UV, acid spray, and so on—and now he stood on the land of Venus, with a transparent impervium dome catching rainbows wherever the fugitive sun broke through the cloud blanket. The air smelt the same. That was a tip-off. The free air of Venus was short on oxygen and long on carbon dioxide; it was breathable, but not vintage atmosphere. And it was unmistakable. Here, under the dome, the atmospheric ingredients were carefully balanced. Necessary, of course—just as the impervium shell itself seemed necessary against the fecund insanity that teemed the Venusian lands—flora and fauna bursting up toward the light, homicidally and fratricidally determined to bud and seed, to mate and breed, in an environment so fertile that it made its own extraordinary imbalance.

On the shore stood the old Fort, one-time stronghold of the Doonemen Free Companions. It had been rehabilitated. It, too, was inclosed under the impervium, the great shell a quarter of a mile in diameter. There were small houses arranged here and there, with no attempt at planning. The houses themselves were of all shapes, sizes, and colors. With no rainfall or winds here, the architects had a free hand. The only limitations were those of natural gravity, and paragravitic shields made even Pisa-towers possible. Still, there

was nothing really extravagant in material or design. No lavishness. The whole Colony had an air of faint attrition.

There was no open land visible beneath the dome.

The ground had been floored over with plastic materials. Protection against the ground-lichens? Probably. Great hydroponic tanks were the gardens, though a few shallow tanks held sterilized soil. Men were working, rather lazily. It seemed a siesta hour.

Sam walked along one of the paths, following the sign that pointed toward Administration. A mild agoraphobia afflicted him. All his life he had dwelt under an opaque dome, knowing the weight of water above it, shutting out the upper air. Now through the translucent impervium above he had glimpses of watery sunlight, and the illumination was not artificial, though it seemed a bad imitation of the surrogate daylight of the Keep lamps.

His mind was very busy. He was taking in all he saw, evaluating it, packing facts and impressions away against the moment when his innate opportunism saw its chance. He had for the moment dismissed Sari and the Harkers. Let that group of ideas settle and incubate. How Robin Hale would receive Sam Reed, or Sam's son, was the important question now. He did not consider that he owed Hale any debt. Sam did not think in terms like that. He thought only in terms of what would best benefit Sam Reed—and the Colony was something that still looked promising to him.

A girl in a pink smock, bending over a tank of growing things, looked up as he passed. It was curious to see the effect even diluted sunlight made upon the faces of these Landsiders. Her skin was creamy, not milk-white as Sari's in the Keep. She had smooth brown hair, brushed sleek, and her eyes were brown, with a subtly different focus from the eyes of Keep people. An impervium dome shut in her life as fully as any undersea Keep life, but light from the sun came through it, and the jungle pressed ravenously against the gates—a hungry, animate jungle, not the dead weight of sea water. You could tell by her eyes that she was aware of it.

Sam lingered a little. "Administration?" he asked unnecessarily.

"That way." Her voice was pleasant.

"Like it here?"

She shrugged. "I was born here. The Keeps must be wonderful. I've never seen a Keep."

"You wouldn't know the difference—there isn't any," Sam assured her, and went on with a troubling thought in his mind. She had been born here. She could be no more than twenty. She was pretty, but not wholly to his taste. And the idea had come to him that if she had only partially the qualities he liked in a woman, he could afford to wait for her daughter, or her daughter's daughter—if he chose the parents of the final product with reasonable care.

An Immortal could work out a strain of humanity as a mortal could breed for elegance in cats or speed in horses. Except that the product would be only a cut flower, lovely but perishing in a day. He wondered how many of the Immortals did just that, maintaining in effect a harem in time as well as in space. It would be excellent, so long as one's emotions remained unengaged.

The Governor of the Land Colony should have been busy. He wasn't. A minute after Sam sent in his assumed name, the door opened with an automatic click and he walked into Robin Hale's office.

"Joel Reed?" Hale said slowly. His stare was intent, and it took all Sam's hardihood to meet it without shrinking a little.

"Yes. Sam Reed was my father." He said it with a bit of bravado.

"All right," Hale said. "Sit down."

Sam looked at him through the thin protection of his eye shields. It might have been yesterday they met last, Hale had changed so little. Or—no, he had changed, but in ways too subtle for the eye to catch. The voice told more of the story. He was still thin, still brown, still quiet, a man whose mind was attuned to patience because of the years behind him and the centuries ahead. He could acccept any defeat as temporary, and any victory as evanescent.

This change in him was temporary too, but no less real for that. He had not quite the quiet enthusiasm of voice and manner that Sam remembered. The thing he had been working toward with high hope when they parted was an accomplished fact now, and a finished failure. But it was so brief a thing in the total of Hale's experience—that was it, Sam realized, staring at the man.

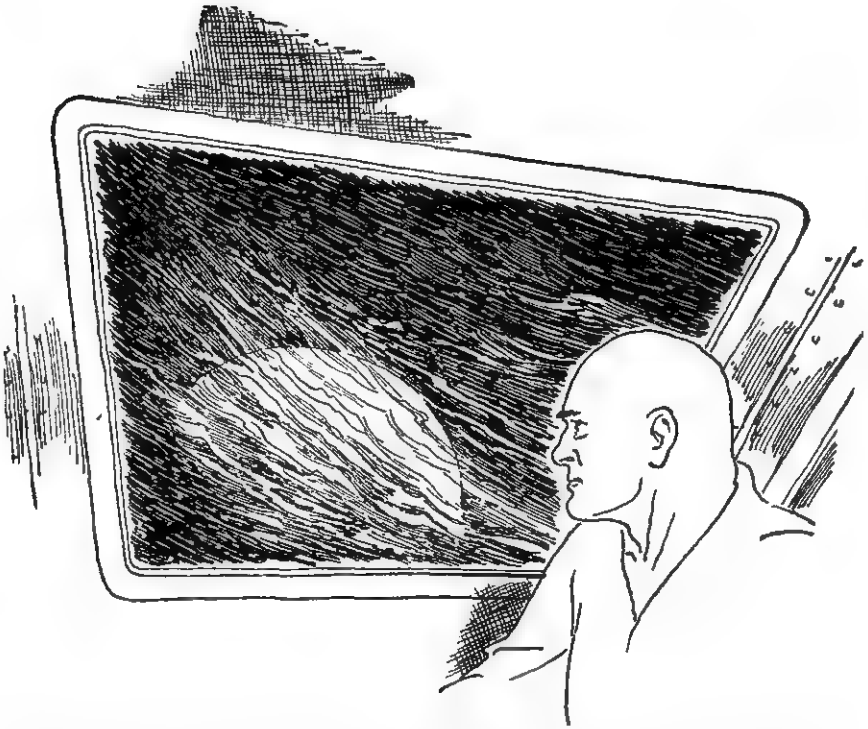
Robin Hale remembered the Free Companion days, the long war years, the time generations past when the last vestiges of mankind had been free to roam the seas, free to face danger. It had been matter-of-fact enough, Sam knew. A business, not a swashbuckling romance. But emotions had run high and the life the Free Companions led was nomadic, the last nomads before mankind returned wholly to the shelter of the Keeps, the stagnation of the underseas. The Keeps were the tomb, or the womb, or both, for the men of Venus, who had begun their life as wild tribesmen on Earth.

Sam was beginning to feel the first stirrings of interest in his own kind as a long-term investment for a long-lived Immortal.

"Are you a volunteer?" Hale asked.

Sam came back to himself with something of a jolt. "No," he said.

"I didn't know Sam Reed had a son." Hale was still looking at him with that quiet, speculative stare that Sam found hard to meet. Could one Immortal know an-



other, through any disguise, simply by those mannerisms no man could wholly hide? He thought it likely. It didn't apply to himself —yet, for he was not yet immortal in the sense that these others were. He had not acquired the long-term view with which they kept life at bay.

"I didn't know myself until just lately," he said, making his voice matter-of-fact. "My mother changed my name after the Colony scandal."

"I see." Hale was noncommittal.

"Do you know what happened to my father?" That was pushing things. If Hale said, "Yes—you're Sam Reed," it would at least settle this uncertainty. But if he didn't, it need not mean he had failed to recognize Sam.

The Free Companion shook his head. "He dream-dusted. I suppose he's dead by now. He'd made enemies after the bubble burst."

"I know. You . . . you must have been one of them."

Hale shook his head again, smiling faintly. Sam knew what the smile meant. One neither hates nor loves the ephemeral short-lived. Temporary annoyance is the worst they can evoke. Nevertheless Sam was not tempted to reveal himself. Olympians had the god-prerogative of being unpredictable. Zeus tossed thunderbolts on impulse.

"It wasn't Sam Reed's fault," Hale said. "He couldn't help being a swindler. It was born in him and bred in him. Anyhow, he was only a tool. If it hadn't been Sam, it would have been someone or something else. No, I never hated him."

Sam swallowed. All right, he had asked for that. Briskly he moved on to the next point. "I'd like your advice, Governor Hale. I've only learned who I really am lately. I've been checking up. I know my father was a crook and a swindler, but the government found his caches and paid back everything—right?"

"Right."

"He left me nothing—not even his name, for forty years. But I've been investigating, just in case. There was one asset my father had when he dream-dusted, and that wasn't taken away from him. A land-grant. Forty years ago the government issued him a patent on certain Venusian land areas, and that grant's still valid. What I want to know is this: Is it worth anything?"

Hale tapped his fingers on the desk. "Why did you come to me?"

"My father was with you when the Colony started. I figured you'd know. You'd remember. You're an Immortal; you were alive then."

Hale said, "I knew about that patent, of course. I tried to get hold of it. But it was in your father's name, absolutely watertight. The government wouldn't release. As a matter of fact, land-grants aren't revokable. There's a reason. On Venus all colonies presumably have to depend for existence on the Keeps, and it would be easy to cut off supplies if necessary. So you've inherited that patent, eh?"

Sam said, "Is it worth anything?"

"Yes. The Harkers would pay you a good deal to suppress the information."

"The Harkers? Why?"

"So I couldn't start a new colony," Hale said, and his hand on the desk opened slowly from a tight-balled fist. "That's why. I started this Colony, after your father—after the collapse. I went ahead anyway. The good publicity we'd built up boomeranged. We had to start on a skeleton crew. Just a few, who believed in the same things I did. Not many of them are still alive. It was a tough life in the beginning."

"It doesn't look so tough," Sam said.

"Now? It isn't. The Colony's been emasculated. You see—what the Harkers did was try to stop me from even starting the Colony. They couldn't stop me. And after I'd started, they didn't dare let me fail. Because, eventually, they want to colonize Venus, and they don't want the psychological effect of a failure chalked up in history. They couldn't let me fail once I'd started, but they wouldn't let me succeed either. They didn't believe I *could* succeed. So—"

"So?"

"Attrition. Oh, we worked hard the first year. We did it with our fingernails. We didn't lick the jungle, but we started. We got the Colony cleared and built. It was a fight every step, because the jungle kept pushing back in. But we kept going. Then we were ready to reach out—to establish a new beach-head. And the Harkers stopped us cold.

"They cut off our supplies.

"They sat in the Keeps and made sure there wouldn't be any volunteers.

"The equipment dwindled. The power dwindled. The machines stopped coming.

"According to the original charter, we had to show an annual profit. Or the government could step in as administrator till matters got on an even basis again. They couldn't take my grant away from me, but they could cut down the blood supply so the Colony wouldn't be able to show a profit. That's what they did, thirty-four years ago. Since then, the government has been administrator here—maintaining the *status quo*.

"They administer. They give us enough supplies so we won't fail. But not enough so we can go forward. They don't want us to go forward—because there's the risk of failure. They want to wait until there's no risk. And that time will never come."

Hale looked at Sam, a deep fire beginning to glow far back in his eyes under the scowling brows. Was he talking to Joel Reed—or to Sam? It was hard to be sure. Certainly he was saying more than he would say to the casual visitor.

"My hands are tied," Hale went on. "Nominally I'm Governor. Nominally. Everything here has come to a full stop. If I had another patent—if I could start another colony—" He paused, looking at Sam from under meeting brows. "They won't grant me a patent. You can see how important yours is. The Harkers would pay you very well to suppress it."

That was it, then. That was the reason behind his freedom of speech. He had finished, but he did not look at Sam. He sat motionless behind his bare-topped desk, waiting. But he made no plea and no argument.

For what could he offer the man before him? Money? Not as much as the Harkers could offer. A share in the new colony? By the time it would begin to pay off any short-term man would be long dead.

On impulse Sam said suddenly, "What could you do with the patent, Governor?"

"Start over, that's all. I couldn't pay you much. I could lease the patent from you, but there'd be no profit for many years. They'd be eaten up by the costs. On Venus a colony has to keep moving, spreading out. It's the only way. I know that now."

"But what if you failed? Wouldn't the government come in again as administrator—the same thing over again? Wouldn't they see you did fail?"

Hale was silent.

Sam hammered at him. "You'd need a big stake to start a new colony. You—"

"I'm not arguing," Hale said. "I told you you'd get more money from the Harkers."

It was Sam's turn for silence. A dozen possibilities were already taking shape in his mind—ways to raise money, to circumvent the Harkers, to spread propaganda, to make the next colony a success in spite of all opposition. This time he thought he could do it. He had all the time in the world and it would be worth his while now to invest it in a successful colony.

Hale was watching him, a flicker of hope beginning to show through the fatalistic inertia which had dulled all he said until now. And Sam was a little puzzled by the man. With all that long life behind him, all that unthinkable maturity which must be the sum of his experiences, still he had turned once and was ready to turn again to Sam Reed, short-lived, immature to the point of childishness from an Immortal's view. Hale was ready to let his most cherished venture fail for lack of ideas and initiative, unless this man before him, short-lived as a cat and as comparatively limited in scope, could take over for him.

Why?

A vague parallel with the social history of Old Earth swam up in Sam's memory. Somewhere in his reading he had encountered the theory that those countries on Earth which the Mongol hordes invaded in very ancient times had been so completely vitiated by the terrible experience that they had never again been able to regain their initiative. With all the resources their countries offered, the people themselves remained helpless to use them or to compete with other peoples who had not been robbed of that essential spark.

Perhaps the same thing had happened to Robin Hale. He was the only man alive now who had fought with the Free Companions. Had he expended in those wild, vigorous years the spark that would move him now if he still possessed it? He had the centuries of experience and knowledge and accumulating maturity, but he no longer had the one essential thing that could let him use them.

Sam had it, in abundance. And it occurred to him suddenly that perhaps of all men alive he alone did possess it. Hale had the long life but not the will to use it. The other Immortals had initiative enough, but—

"If we wait on the Families, the time never will come to move," Sam said aloud, in a marveling voice, as if he had never heard the idea before.

"Of course not." Hale was calm. "It may be too late already."

Sam scarcely heard him. "They think they're right," he went on, exploring this new concept which had never dawned on him before. "But they don't want a change! They'll go right on waiting until

even they recognize they've waited too long, and then maybe they'll be a little bit glad it *is* too late. They're conservatives. The people on top are always conservatives. Any change has got to be for the worse so far as they're concerned."

"That applies to the Keep people, too," Hale told him. "What can we offer any of them to match what they already have? Comfort, security, plenty of entertainment, a complete, civilized life. All we have up here is danger and hardship and the chance that maybe in a couple of hundred years they can begin to duplicate on land what they already have undersea, without working for it. None of them would live to cash in on the rewards even if they saw the necessity for changing."

"They responded once," Sam pointed out. "When . . . when my father promoted the first Colony scheme."

"Oh, yes. There's plenty of discontent. They know they're losing something. But it's one thing to talk about romance and adventure and quite another to endure the danger and hardships that make up the total sum. These people lack a drive. Pioneers are pioneers because conditions at home are intolerable, or because conditions elsewhere look more promising or . . . or because there's a Grail or a Holy Land or something like it to summon them. Here it's simply a small matter like the salvation of the race of man—but intangibles are beyond their grasp."

Sam wrinkled red brows at him. "Salvation of the race of man?" he echoed.

"If colonization doesn't start now, or soon, it never will. Our korium supplies will be too low to support it. I've said that over and over until the words come out whenever I open my mouth, it's that automatic. The race of man will come to an end in a few more centuries, huddled down there in their safe Keep-wombs with their power-source dwindling and their will to live dwindling until nothing remains of either. But the Families are going to oppose every move I make and go on opposing like grim death, until it's too late to move at all." Hale shrugged. "Old stuff. It's out of fashion even to think in those terms any more, down in the Keeps, they tell me."

Sam squinted at him. There was conviction in the Immortal's voice. He believed Hale. And while the ultimate destiny of the race was far too vague a concept to worry Sam at all, his own increased life-span made the next few hundred years a very vital subject. Also, he had a score to settle with the Harkers. And there were almost unlimited possibilities in this colonizing project, if it were handled by a man like Sam Reed.

He was beginning to see the dawning flicker of a magnificent idea.

"The patent's yours," he said briskly. "Now look—"

Robin Hale closed the shuttered door of Administration behind him

and walked slowly down the plastic path, alone. Overhead the glowing rayness of the Venusian day lightened briefly with a flash of blue sky and sun, filtered diffused through the impervium overhead. Hale glanced up, grimacing a little against the brightness, remembering the old days.

A man in brown overalls some distance away, was leisurely moving a hoe around the roots of growing things in one of the broad beds of soil dug from Venus' overfertile ground. The man moved quietly, perhaps a bit stiffly, but with the measured motions of one who knows and enjoys his work. He lifted a gaunt, long-jawed face as Hale paused beside the shallow tank.

"Got a minute?" Hale asked.

The man grinned. "More than most," he said. "What's on your mind?"

Hale put a foot on the rim of the tank and crossed his arms on the lifted knee. The older man leaned comfortably on his hoe. They looked at each other for a moment in silence, and a faint smile on the face of each told quietly of the things they had in common. These two, of all men now alive, remembered life under an open sky, the succession of night and day, sun and moon, the natural rhythms of a world not ordered by man.

Only the Logician remembered a day when the soil of an open planet had not been man's deadly enemy. Only he of all the workers here could handle his hoe in leisurely communion with the turned dirt, knowing it for no enemy. For the others, the very sight of soil meant dangers seen and unseen, known and unknown—fungi in the brown grains they hoed, bacteria of unguessable potentialities, mysterious insects and tiny beastlings lurking ready for the next stroke of the blade. This soil, of course, had been processed and was safe, but conditioning dies hard. No one but the Logician really liked these beds of open ground.

Hale had been surprised only superficially when he first thought he recognized the gaunt figure wielding the hoe as he backed slowly along a path between brown seed beds. That was not very long ago—a few weeks, perhaps. He had paused beside the tank, sending his subordinates on ahead, and the older man had straightened and given Hale a keen, quizzical look.

"You're not—" Hale had begun hesitantly.

"Sure." The Logician grinned. "I'd have come topside a lot sooner, but I've had a job needed finishing. Hello, Hale. How are you?"

Hale had said something explosive.

The Logician laughed. "I used to be a dirt farmer back on Earth," he explained. "I sort of got the itch. That's one reason, anyhow. I'm a contingent volunteer now. Used my own name, too. Didn't you notice?"

Hale hadn't. Much had happened to him since he last stood in the Temple of Truth and listened

to this man's voice coming impressively from the oracular globe. The name of Ben Crowell hadn't caught his eye, though the volunteer lists were scanty enough these days that he should be able to recite them from memory.

"Somehow I'm not very surprised," he said.

"Needn't be. You and I, Hale, we're the only men left now who remember the open air." He had sniffed elaborately, and then grinned up at the impervium dome. "We're the only ones who know this isn't. Did you ever locate any more of the Free Companions? I've wondered."

Hale shook his head. "I'm the last."

"Well"—Crowell struck off a random runner with his hoe—"I'll be here awhile, anyhow. Unofficial, though. I can't answer any questions."

"You haven't done that even in the Temple." Hale was reminded of a grievance. "I've been to see you maybe a dozen times in the last forty years. You wouldn't give me a single audience." He looked at the Logician and for a moment illogical hope quickened in his voice. "What made you come landside—now? Is something going to happen?"

"Maybe. Maybe." Crowell turned back to his hoe. "Something always does sooner or later, doesn't it? If you wait long enough."

And that was all Hale had been able to get out of him.

Hale was remembering that conversation now as he told the Logician what had just happened.

"Is that why you came up here?" he demanded at the end of his story. "Did you know?"

"Hale, I just can't tell you. I mean that. I can't."

"Don't you know?"

"That hasn't got anything to do with it. Don't forget every talent's got its drawbacks, too. It's not so much prescience I've got as it is infallibility—and that's fallible by definition. I told you once it was more horse sense than anything else." Crowell seemed mildly irritated. "I'm not God. Don't start thinking like the Keep men—wanting to shift every responsibility. That's one thing wrong with Venus today. The leave-it-to-George fallacy. George isn't God either. And God *Himself* can't change the future—and still *know* what's going to happen. Minute He meddles, you see, he introduces a new factor into the equation, and it's a random factor."

"But—"

"Oh, I've interfered a time or two," the Logician said. "Even killed a man once, because I figured nothing worse could happen than letting that particular fella live. Turned out I was right, too—in that case. Only I don't interfere any more than I can help. When I do, I step in as the random factor, and, since I'm *in* it, it isn't easy to look at the whole equation from outside. I can't predict *my* reactions—see?"

"More or less," Hale said thoughtfully. "Yet you say you've interfered when you had to."

"Only then. And afterwards I've tried to make things come out even again. The way it is, there's a balance. If I step into the right-hand pan, the balance shifts in that direction. So afterwards I try to give the other pan a little push—so x will equal x again. If I add y to one side, I try to subtract y from the other. I admit it don't look too sensible from where you're sitting, but it sure does from my perch, son. Like I say, I'm not God. Not the God the Keeps want today, certainly. They expect God to come down and push 'em around in a wheel chair."

He paused, sighed, glanced up at the impervium dome where a streak of blue sky let sunlight glow briefly through the Colony. "What did Reed want?" he asked. "He's got some ideas, I take it. What are they?"

"I don't see why I need to tell you," Hale said irritably. "You probably know more about it than I do."

The Logician struck his hoe handle a light blow with his closed fist. "No, son, not strictly speaking. There's the best reason in the world why I can't tell you what I know. Some day maybe I'll take time to explain it. Right now I'd be mighty glad to hear what young Reed's up to."

"We looked over the maps. His patent covers a three-hundred-mile area with about a hundred miles of seacoast. I asked for that originally because one of the Free Companion Forts stood on the shore there. It's a good base. I remember it was chosen for its harbor. A chain of islands shields it and curves out westward in a long sweep."

In spite of himself, Hale's voice quickened. "There won't be an impervium dome over this colony. You've got to adapt to colonize. And you can't have a balanced ecology with one atmosphere outside and another inside. Still, we'll need protection from the landside life. I think water's our answer to that. The islands make natural stepping stones. We'll bring them under control one after another and move along to the next."

"Um-hum." The Logician pinched his long nose thoughtfully. "Now what's going to stop the Families from the same tricks they used to kill *this* Colony?"

Hale coughed. "That remains to be seen," he said.

Even nightfall had its own strange, exotic quality to a Keep-bred man. Sam clutched the chair arms in the tossing plane that carried him back to Delaware Keep and looked out fascinated at the deep darkness gathering over the sea. Venus air currents are treacherous; few planes attempt flight unless really necessary, and even those flights are short ones. Sam's view of the scene below was intermittent and jolted. But he could see, far off in the gathering darkness, the great submerged glow that was the Keep, spreading its stain of light upon the water. And he was aware of an unaccustomed emotional pull.

That vast spreading glow was home —safety, companionship, lights and music and laughter. The Colony behind him was sterile by contrast, the dwelling place of danger and defeat.

It wouldn't do. He would have to think of something very good to counteract this emotion which he himself was heir to, and all the rest of the Keep's numbered thousands. A pioneer needs bad home conditions and the promise of a Grail or a City of Gold beyond the wilderness to draw him on. Push plus pull, Sam thought. But in this case the bad conditions were all on the wrong side of the scale, from the promoter's viewpoint. Something would have to be done.

Success would require korium, enthusiastic recruits and Harker acquiescence if not actual Harker backing. So far he had nothing. And he would have to work fast. At any moment, once he landed, private police might come up beside him as they had come before, and Sam Harker would drop out of sight, quite possibly forever. He had little money, no prestige, no friends except one old man dying of drugs and senility, and even that friendship had to be bought.

Sam laughed softly to himself. He felt wonderful. He felt exultantly confident. He was perfectly sure of success.

"The first thing I've got to do," he said to the Slider, "is get myself before the public. Fast. I don't care how, but I've got to go on record in opposition to the Families so fast they won't have time to snatch me. Afterward I'll take care to make it plain if I do vanish they'll be responsible."

The Slider wallowed and sniffled. The small room was stifling, but it was comparatively safe. So long as Sam stayed here in these underworld haunts he still knew well, he was unlikely to vanish into the Harker stronghold. Once he stepped out, the tale might be quite different.

"Give me another drink," was all the Slider said in answer.

"I've got two thousand credits," Sam told him, pushing the bottle closer. "Hale can raise maybe another two thousand. We've got to make a fast start on that. You tell me where I can spend it to stretch it farthest. I'll want newscast time and a good semantics man to dope out our opening speeches. Once we're started, enough money will come in to keep us going. And this time I'm not going to pour it all down a rat hole. It's going to go where it'll do the most good."

"Where?" The Slider cocked an inquiring, hairless brow above his bottle.

"Into a fleet," Sam said grimly. "This time the new colony will be an island-chain. We're going to stay mobile. We're going to fight the sea beasts for the islands, and fortify them and settle in. We'll need good fast boats, well armored, with good weapons. That's where the money's going."

The Slider sucked at his bottle and said nothing.

Sam didn't wait for his propaganda machine to start paying off

before he began placing orders to outfit his boats. He cut corners wherever he could, but most of his four thousand credits went under assumed names into secret orders for the materials Hale had figured as basic necessities.

Meanwhile the propaganda got under way. There wasn't time or money for a subtle approach such as Sam would have preferred. A long campaign of cunningly devised songs stressing the glamour of landside life, of the open skies, the stars, the succession of night and day—that would have helped. A successful play, a new book with the right emphasis would have made it much easier. But there wasn't time.

The televisors carried paid-for commercials. Robin Hale announced a new colony under a separate charter. And boldly, openly, because it could not be helped or hidden, Joel Reed's connection with the scheme was made public.

Joel on the screen spoke frankly of his father's disgrace. He disclaimed all knowledge of his father. "I never knew him," he said, putting all of his considerable persuasive powers behind the words. "I suppose a great many of you will discount everything I say, because of my name. I haven't tried to hide it. I believe in this colony and *I can't afford to have it fail.* I think most of you will understand that. Maybe it'll help prove that I mean what I say. I wouldn't dare come before you, using my right name with all the disgrace you know belongs to it, if I didn't know the colony *must* succeed. No one named Reed would dare to try the same thing twice. I'm not. If the colony fails it'll mean my own ruin and I know it. It won't fail." There was quiet conviction in his voice, and something of his enthusiasm carried over to the listeners. He was telling the truth this time. Some of them believed him. Enough of them believed him, for his purposes just now.

The same urges and stresses which had made the first colonization plans successful were still present. Subtly men sensed the losses Keep life imposed upon them. They yearned obscurely for lost heritages, and there were enough of the yearners to give Sam and Hale the finances they needed to meet immediate demands. It wasn't very much, but it was enough. The rest sat back and waited to be convinced.

Sam moved to convince them.

The Harkers, of course, were not idle. After the first startled hour, they moved too, quite rapidly. But here they operated at a slight disadvantage. They couldn't openly oppose the colonization scheme. Remember, they were supposedly in favor of colonization. They could not afford to have a colony actually fail. So all they could do was start counterpropaganda.

Word went out of a mutated virulent plague that had begun to develop landside. A robot plane crashed spectacularly on the news screens, torn apart by the violent wind tides of the upper air. It was dangerous up there on the land, the rumors increasingly declared.

Too dangerous, too uncertain. . .

And then Sam made his next bold stroke. Almost openly he attacked the Harkers. Almost specificially he accused them of responsibility in the failure of the present Land Colony. "There are powerful forces at work," Sam declared, "to prevent the colonization of the land. You can see why. Anyone could see. Put yourself in the place of a powerful man, a powerful group of men. If you were governing a Keep, wouldn't you be perfectly contented with things as they are? Would you want any changes made?. Wouldn't you do all you could to discredit those who offer opportunities landside to men like us?" Sam leaned to the screen, fixing his audience with a steady, significant gaze. "Wouldn't you try to silence anyone who fought to give the common man a chance?" he demanded, and then held his breath, waiting to be cut off the air.

But nothing happened. Perhaps the technicians were too stunned. Perhaps even the Harkers dared not challenge public opinion that far. Sam went on while he could. "I hope to continue working toward the new colony," he said. "I'm working for myself, yes—but for all of you others, too, who are *not* rulers in the Keeps. As long as I'm alive I'll keep on working. If I don't come on the air again tomorrow to report our new plans—well, you people of the Keeps will know why."

There was an extroordinary, soft, rumbling murmur in the streets of Delaware Keep as Sam signed off, leaving those words still humming in the air. For the first time in many decades, crowds had begun to gather again beneath the big public news screens, and for the first time in human history on Venus, the murmur of the crowd-voice had lifted from Keep Ways. It was in its way an awe-inspiring sound—the faintest murmur, murmur of surprise rather than menace, but a murmur that could not be ignored.

The Harkers heard it. And bided their time. They had so much time—they could afford to wait.

So Sam had his temporary insurance against the private police. He made rapid steps toward consolidating his position. He had to find some hold over the Harkers stronger than this gossamer lever based on the unpredictable masses.

Sari was his only key. Sari Walton, half Harker by blood—and certainly abnormal. Why? Sam tried hard to find out. There was little material on file about the Immortals—only vital statistics and names and brief histories. It was true that the Immortals, by their very longevity, were spared many of the stresses that drive a short-termer into neuroses. But that very longevity must in its way impose other stresses incomprehensible to men of normal life.

Sam searched and pondered, pondered and searched. He traced many ideas up blind alleys and abandoned them. Eventually he came across one small factor that

looked promising. At best it was not conclusive—only indicative. But it pointed an interesting path.

The reproductive cycle of the Immortals was a curious one. They had successive periods of fertility, usually at intervals of fifty to seventy-five years and covering only a brief time. The child of two Immortals had never yet failed to show all the traits of long life. But the children were not strong. Their mortality rate was high, and most of them had to be reared almost under glass.

Sam was interested to discover that at the time of Sari Walton's birth a son had been born to the Harker family too—a son named Blaze. These two children were the only surviving offspring on record for that particular period in Delaware Keep.

And Blaze Harker had apparently vanished.

With increasing interest Sam traced through the records, searching for some explanation of what had happened to the man. No death date appeared. The usual records of education and various duties and enterprises for Blaze went steadily along up to a date seventy years past. And then Blaze vanished.

Sam filed the information away with a sense of profound excitement.

"This one ought to do," the Free Companion said, stepping back from the view-glass. "Look."

Sam crossed the pitching deck unsteadily and bent to the eyepiece. He felt half-drunk with this unaccustomed atmosphere, the motion of the boat, the wet wind in his face. There was so much about open air that took getting used to—even the feel of the breeze was faintly alarming, for in the Keeps a wind meant entirely different things from the random winds of landside.

The milk-white water heaved around them under the milky sky. On shore the great festooned hulk of a ruined fort seemed to stagger under the weight of jungle rioting over it. There was a constant murmur from the jungle, punctuated by a pattern of screams, flutings, hisses, roars from invisible beasts. The sea lipped noisily at the boat's sides. The wind made meaningless noises in Sam's ears. Landside was strangely confusing to the Keep-bred.

He put his forehead in the head rest and looked down.

Another world sprang into being, a world of wavering light and wavering weed, threaded by the wavering shapes of underwater things, fish with shivering fins, siphonophores trailing their frost-like streamers, jellyfish throbbing to a rhythm of their own. Anemones clenched into brilliantly striped fists with a dreamlike slowness. Great fans of dazzingly colored sponge swayed to the random currents.

And buried in this bright, wavering world, visible only in rough outlines beneath the weeds, lay the hulk of a sunken ship.

It was the third they had found which Hale seemed to think worth salvaging. "And they're in better

shape than you think," he assured Sam. "Those alloys are tough. I've seen worse wrecks than this rehabilitated in the old days." His voice trailed off and he looked out over the empty water, remembering.

You could almost see it peopled by the fleets of the Free Companions as Hale must be seeing it, very clearly over the generations already gone. The Keeps had been sacrosanct then as now, for only under their impervium domes did civilization survive. But the token wars had raged between them, on the surface of the gray seas, between fleets of hired mercenaries. The Keep that backed the loser paid its korium ransom, sometimes only after token depth bombs had been dropped to remind the undersea people of their vulnerability.

It all passed. The jungle ate up the great forts and the sea giants sank at their moorings. But they did not crumble. That much was apparent now. The weeds grew over and through them and the lichens nibbled at their fabric, but the strong basic structure remained.

Hale and Sam had searched the coasts of Venus where the old forts stood. Hale had known the forts when they were alive. He knew the harbors and could still quote the battle strength of the Companies. The first two hulks they had salvaged were already nearly seaworthy again. And there was a new enthusiasm in Hale's voice and in his eyes.

"This time they won't pin us down under impervium," he told Sam, gripping the rail and grimacing as spray blew in his face. "This time we'll stay mobile no matter what it costs us."

"It'll cost plenty," Sam reminded him. "More than we've got. More then we're going to get, unless we do something very drastic."

"What?"

Sam looked at him thoughtfully, wondering if the time had yet come to take Hale into his confidence. He had been building toward the revelation for weeks now, leading Hale step by step toward a solution he would have rejected flatly at their first interview.

Sam was applying to his current problem exactly the same methods he had applied—almost by instinct—when he woke in the alley with dream-dust still fragrant in his nostrils. In the weeks since that wakening he had retraced in swift strides the full course of a career that paralleled the career of his earlier life, condensing forty years' achievements into a few brief weeks. Twice now he had come into the world penniless, helpless, every man's hand against him. Twice he had lifted himself to precarious success. This time his foot was only on the first rung of a ladder that leaned against the very stars. He assured himself of that. Failure was inconceivable to him.

By misdirection and cunning he had tricked Doc Mallard into a catspaw play and seized the korium he needed to start him on his upward climb. It was korium he wanted again now, but the Harkers were his adversaries this time and

they were a much more difficult problem.

Remembering his method with Doc Mallard, he had searched in vain for some lure he could dangle to tempt them out on a limb. He could think of nothing. The Harkers already had everything they could desire; their position was almost impregnable. There was, of course, Sari. Sam knew that if he could plan some subtle but strong irritation for her, and make sure she had narco-dust at the time, she was almost certain to kill either Zachariah or herself—or both. That was one weapon. But it was terrifyingly uncertain, and it was too strong. He meant to kill Zachariah, eventually. But death was no solution to this current problem.

There was a parallel here between the weapons at Sam's command and the weapons men had with which to attack the Venusian landside. In both cases the only available weapons were either too weak or too strong. Utter destruction was no answer, but the only alternatrve would leave the adversary essentially untouched.

Sam knew he must either give up entirely or take a step so bold it would mean total success or total ruin.

"Hale," he said abruptly, "if we want enough korium to colonize the land, we've got to do something that's never been done before. We've got to bomb the Keeps."

Hale squinted at him and then laughed. "You're joking."

"Maybe." Sam hunched his shoulders and glanced at the smothered fort across the water. "You know anything better?"

"I don't know anything worse." Hale's voice was sharp. "I'm not a murderer, Reed."

"You were a Free Companion."

"That's a different matter altogether. We—"

"You fought the Keeps' battles, at the Keeps' orders. That was necessary, under the circumstances. You did what you had to in the way of killing, plundering—piracy, really. The losing Keep paid up in korium or faced bombing. It was a bluff, I suppose. None of them were ever really bombed. Well, what I'm suggesting is a bluff, too. The Families will know it. We'll know it. But we've got to outbluff them."

"How can we?"

"What have we got to lose? They're at that much of a disadvantage—they have everything to lose. We have everything to gain."

"But they'll *know* we don't dare do it. People won't even take the threat seriously. You know the Keep people. They're—inert. They've never known a menace. It won't be conceivable that we could bomb them. They'll laugh at us. The race has outlived the fear of danger. We'd have to bomb one Keep and kill thousands of people before we could convince them we meant business. I—"

Sam's laugh interrupted him. "I'm not so sure. We're still human beings. It's true there's been no war or danger for a good many generations—but men still wake up

with a dream of falling as old as the first arborean who lost his grip on a tree limb. Men's nostrils still dilate when they're angry, because when the pattern was first set they had to . . . to breathe—because the mouth was full of the enemy! I don't think we've shed our fears quite so easily as you think."

"Well, I won't do it," Hale said firmly. "That's going too far. It's out of the question—"

The threat, when it first sounded over the news screens, was as shattering as a bomb itself. There was dead silence in every Keep for a long moment after the words had rung out from the big screens. Then tumult. Then laughter.

Hale had been right—in part. No one believed in the threat of the rehabilitated fleet. The colonies depended for their very existence on the support of the Keeps. They would not dare bomb their sources of supply. And if they were mad enough to do it, every man reasoned in those first few minutes, the chances were strong that it would be some other Keep that got the depth charges—not his own.

Then Sam on the public screens named the Keep—Delaware. He named the time—now. He named his price—korium.

And the battle of wills was on.

But Sam had a weapon before he launched his bluff that gave him confidence. It was not a very strong weapon, but that simply meant he must use more skill in wielding it. It had to succeed. This was a point from which no turning back was possible.

The weapon, like all the most effective weapons man can use against man, was personal.

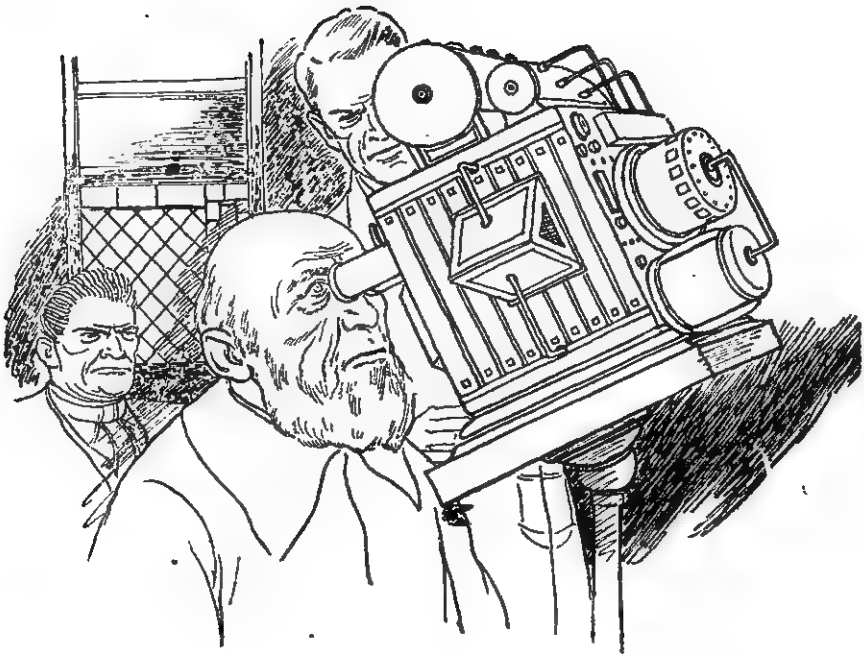
He had found Blaze Harker.

In the final analysis the whole struggle was a conflict between two men—Sam and Zachariah. The Families of the Immortals ruled the Keeps, the Harkers set the pattern for all other Families, and Zachariah was the head of the Harker clan. Zachariah may or may not have realized himself just where the point of greatest stress lay, but Sam knew. He was gambling everything on the hope that with this lever, and a plan he had made very carefully, he could outbluff Zachariah Harker.

He realized, of course, that the Families must be laying plans of their own. Last time they had worked quietly away in secret until the moment for action came, and in the resulting explosion Sam and all his schemes had been swept away in unimportant fragments. This time things would be different.

It was the Slider who found Blaze for Sam. When the message reached him, Sam went as quickly as the Ways would carry him to the small, foul-smelling den in the slums of Delaware Keep. The Slider was sunk in an Orange Devil dream when he came in, and for a few minutes addressed Sam hazily as Klano and spoke of ancient crimes that not even Sam remembered.

He gave the Slider a drink, and presently the mists faded and the



vast bulk heaved itself up in bed, chuckling and sniffling.

"On that Harker deal, son—I got an address for you." He gave it, grunting.

Sam whirled toward the door.

"Wait a minute, son—hold on there! Where you think you're going?"

"To find Blaze."

"You'll never get in. That place is guarded."

"I'll make a way!"

"Son, you'd need six weeks build-up. You'll have to ferret out somebody who'll take bribes before you could get within a city block of that place. You'll need at least one ringer. You'll need a fast getaway organization afterward. You'll—"

"All right, all right! Let's get started, then. Could you work it?"

"Maybe. I could try."

"Then begin! How long will it take? I can't wait six weeks. Can you do it in three?" He paused, interrupted by the vast, increasing chuckles that sent earthquake waves over the bulk beneath the blankets.

"Forget it, kid. It's already done." Sam stared. The Slider choked on his own laughter. "The old hand hasn't lost its cunning, my boy. Don't think the job wasn't hard—but it's done. Raise that shutter over there—turn off the light. Now watch."

A square of dim illumination appeared on the far wall. Shadows moved across it, blurred by the wall's

irregularities. They were looking at the product of a tiny spy camera, apparently carried about waist-high at the belt of someone who progressed at uneven speed. Sometimes he walked, and the film went along in smooth, rhythmic rocking motion; sometimes he ran and then the pictures flashed by jerkily. When he stopped the eye seemed to stop with him. It resulted in an irregular but very convincing motion picture.

The first seconds of the film showed the little camera apparently staring at an iron grille, very close to the lens. White trousered legs appeared, the grille swung open, a vista unfolded briefly of garden paths and fountains playing. One of the Immortal strongholds, obviously.

There was a feeling of quick, furtive alertness to the pace of the film, the way it kept swinging right and left in tiny arcs as the man who carried it scanned his surroundings. Twice it was apparent that the carrier had ducked into hiding; the film went dark for several seconds when a door or a curtain closed to conceal him. There was a dizzying amount of corridor-walking, all of it quick and giving the impression of stealth.

Then the speed of the carrier increased suddenly—the man was running. Walls bobbed up and down, swung sharply as he whipped around a corner. The film went almost totally dark and walls slid downward before it. A glass-walled lift was rising. More corridors, at a run.

A pause before another grilled door, this substantial looking—bars with adornment. The bars grew enormous, blurred, apparently melted. The lens was pressed close against the door, looking through into the room beyond.

And this, the key scene, ran very fast. There was only a flash of a richly furnished room and a man in it with two others bending over him. The man appeared to be struggling with his companions.

Abruptly the picture swung sidewise, jarred so that everything vibrated. There was a sweeping glance upward, along soaring walls, a flash of ceiling, a flash of scowling face swooping toward the lens and an arm uplifted with something that flashed.

The picture went white and clicked noisily to a halt.

Then it began again. Time retraced itself. The lens was floating toward the melting bars again, very slowly. Very slowly indeed the room inside came into focus. In nightmarish slow motion that gave watchers the opportunity to study every detail the struggling man and his two companions moved upon the wall.

The room was cushioned everywhere. The carpeting looked soft and sank under the pressure of the three men's feet; the walls were paneled head-high with beautifully quilted patterns of velvet. The furniture was thick and soft, no edges showing.

The man who struggled was tall, slender, fine-boned. He had a beautifully shaped head and even in this

convulsive activity his motions were curiously smooth and graceful. It was at first impossible to guess what sort of features he had, they were so contorted in a rapid series of violent grimaces. Blood flecked his face from bitten lips and his eyes were rolled back until no iris showed.

His two adversaries were trying to pull a strait-jacket over his flailing arms.

Little by little they were succeeding. It all happened in that strange slow motion that gave the whole performance a look of calculated rhythm, like a ballet, robbing the struggle of any spontaneity because it happened so slowly. The tall man beat his prisoned arms against his sides, threw back his head and laughed wildly and soundlessly, blood running down his chin. The laughter changed without a break into sheer rage and he hurled himself sidewise with a cunning lurch and carried one of his attendants with him to the floor. The other bent over them, and then the whole scene jigged furiously and swept upward, and the film clicked to a halt.

"That was Blaze Harker," the Slider said in the brief silence that followed. "Give me a drink, son. Have a shot yourself—you look like you need one."

"—and so it's come down to this," Sam said over the sea-wide newscast, to the listening thousands. "Give us the korium we have a right to, or take the consequences. The time's past for bargains and promises. This is the showdown. What's your answer, Harker?"

Under all the seas, under all the impervium domes, a breathless silence held as the multitudes watched Sam's magnified face, multiplied many times upon many screens, turn and wait for his reply. And in nineteen of the Keeps as the waiting lengthened a murmur began to grow. To them it was at the moment an academic problem.

But in Delaware Keep the problem was a vital one. There was not a sound in the streets, and for the first time, perhaps, since a Keep had been reared beneath its bubble dome you could hear the deep, soft humming of the Ways as they glided on their endless rounds.

Zachariah kept them waiting exactly long enough. Then with a perfect sense of timing, just as the delay grew unbearable, he gave his signal in his distant study. Sam's face grew indistinct upon the screens of all the Keeps; it hovered in the background like a shadow. Superimposed upon it the serenely handsome Harker face grew clear.

"Reed, you're a fool." Zachariah's voice was calm and leisurely. "We all know this is a childish bluff."

The shadow that was Sam flashed into clarity; Zachariah's face went translucent. Sam said, "I expected you to say that. I suppose you believe it. My first job's to convince you all. There isn't much time, so —look."

Sam and Zachariah alike blurred and vanished from the screen. In their stead a shining seascape grew.

Sunlight shafted down through clouds, touching gray water to blue dazzle. And ploughing through the dazzle, tossing glittering spray over their mailed snouts, a fleet of five ships moved head-on toward the observer.

They were small ships, but they were built for business. Impervium sheathed them in everywhere and their lines were smooth and low and fast. They looked grim. They were grim. And the thing about them that most effectively struck fear to the hearts of the watchers was their complete inhumanity. No man's outlines showed anywhere, except as vague, alarming shadows moving purposefully inside the shells. These were machines for destruction, moving forward to fulfil the purpose for which they had been made.

From beyond the screen Sam's disembodied voice said, "Watch!" and a moment later, at a distance behind the last ship, the sea boiled suddenly into white tumult, erupted high, rained down in diamond showers.

Then the ships grew dim. The screen went briefly blank, and another scene took shape upon it. This time it was a water-world, full of wavering light, greenish-yellow because it was near the surface. Looking up, you could see the water-ceiling as a perfectly tangible thing, quilted and puckered all over with the foreshortened shadows of the waves. Breaking it, the long, sharp bellies of the ships came gliding—one, two, three, four, five—mailed and darkly shining.

The illumination darkened, the ship keels rose and vanished as the scene plunged downward, following the course of a dark, cylindrical something which shot from the last ship in the line. The telefocus stayed constant on the bomb as it slipped silently down through the Venusian sea. Every watcher in the Keeps felt his skin crawl coldly with the question: *What target?*

The sea was deep here. The depth-bomb dropped eternally. Very few watched the missile itself; most eyes were intent on the lower edges of the screens, avid for the first sight of the bottom—

It was sand.

As it came into view, the bomb struck, and instantly the telefocus changed so that the results of the explosion could be visible. Yet not much could be seen. Perhaps that was most terrifying—the swirling, inchoate undersea chaos, the blinding blur on the screen, and the deep, thundering boom of the explosion that carried clearly over the sound beam.

It crashed out and lingered.

Not only through the visors. In Delaware Keep, through fathoms of water, the sound waves rushed and struck with a deep impact on the great impervium shell. Was there the faintest tremor—the slightest possible vibration—in the Keep itself?

Did the Keep—*the Keep!*—shiver a little as the undersea titan smashed his hammer against the sea bottom?

The sound died. There was a stillness.

Far above, in the flagship, Sam flipped sound-absorbant panels into place and turned to the auxiliary screen. He was getting a report.

No face showed on this tight-beam circuit connection. No voice sounded. But Sam automatically translated the scrambled code into an understandable message.

"Kedre Walton left Montana Keep an hour ago. She's just entered Delaware."

Sam instinctively looked down. He used his own scrambler.

"Does she know the situation?"

"Not sure. She'll find out from the public televisors in Delaware."

"Has Sari got the special stuff?"

"As soon as we got word Kedre left Montana. She'll have taken it by now."

The other screen was calling insistently. Robin Hale's voice came from another auxiliary.

"Reed! Are you handling it?"

"I've got it," Sam said, and went back to his Keep connection. But he waited a second, looking into Zachariah's eyes, while he marshaled his thoughts. He couldn't quite repress a twisted, triumphant smile in the face of the Immortal's godlike—but fallacious—confidence.

For his schemes were working. He had chosen the time very carefully indeed. The vital key, the zero hour, depended on just when Kedre Walton returned to Delaware Keep. The psychological hammer blows were far more useful against Immortals than any bomb.

By now Sari should have in her hands the narco-dust Sam had conveniently provided for her, through his new underworld connections. A narco-addict asks few questions. She would have taken the powder the instant it reached her—and this was not ordinary narco-dust.

There was another drug mixed with it.

By now Sari's nerves should be jolting with shock after shock. By now her brain should be building up a high potential, temporarily crumbling away the mortar of caution, of reserve that had held the bricks of her sanity together. By now she should be ready to explode, when the hair trigger was touched. And the direction of her explosion had already been channeled by her own conditioning and environment. Besides, she was born under the same star as Blaze Harker. Not Mars—it was the more baleful star of Earth that glared coldly above the Venus clouds, the star that had given Sari her dangerous heritage of mental instability.

"Reed," Zachariah said calmly, "we can't be bluffed. You won't destroy Delaware Keep."

"That was the first bomb," Sam said. "We're heading for Delaware. A bomb will be dropped every five minutes, till we anchor above you. But we won't stop dropping them then."

"Have you thought of the results?"

"Yes," Sam said. "We have radar and antiaircraft. We have guided missiles. And none of the Keeps is armed. Besides, they're undersea. It's safe undersea—as long as you're not attacked. Then

there's no way to strike back. You can only wait and die."

His voice went out over the public telecast. Sam switched on an auxiliary to focus on one of the great public televisors at a cloverleaf meeting of Ways. A crowd had gathered, he saw. From all directions the Keeps were like arteries carrying the people to their listening post. Red cells, not white—builders, not fighters. Well, they needed builders to colonize Venus.

At present, however, he was fighting the Keeps.

He began to worry, a little, over Hale. He wasn't sure about the Free Companion. If it came to a final showdown, would Hale actually drop a bomb on Delaware? Would he himself?

He mustn't let matters go quite that far.

By now Kedre must be on her way to the Harker stronghold. She would have learned what had happened; the televisors all over the Keep were carrying the news. She would be hurrying to Zachariah's side. Zachariah, whom she had loved for hundreds of years, not with the unflickering glow of a radium lamp, but as a planet inevitably swings toward the sun at perihelion, swinging away toward other planets, but returning whenever the orbit took her close. Yes, she would want to be beside Zachariah in this crisis.

"Another bomb," Sam said.

Again the telefocus shifted. Again a bomb dropped. This time it struck rock. The explosion came in long, rolling thunders through the public visors, and the crowds swayed with the tides and currents of vibration, as seaweed moves in water.

Again the roar continued as underwater sound waves moved in the track of televised sound waves.

And this time men were surer. Delaware Keep shivered slightly.

Silence dropped. The Ways hummed. The people of the Keep waited, in greater throngs than had gathered in the Ways since man first reached Venus, a herd that always, until now, had been guided by the Immortals—watching the duel between Zachariah Harker and the pirate.

Sam said, "Suppose you surrender? The Families may lose a little, but the common people won't. Are you afraid of letting the short-termers go landside? Afraid you won't be able to rule them out there?"

"Any man who wishes to volunteer for your colony is free to do that," Zachariah said. "Just as every man in the Keeps is free. You're trying to get slaves. Men won't go landside yet; it isn't time. It's too dangerous just now. You can't get volunteers. You say you want korium. But I think that will be only your first demand. Later you'll want colony conscription—peonage."

"The time's past for abstruse arguments," Sam said, knowing his voice was heard in every Keep on Venus. "Listen! Pay us the korium we want or we'll bomb Delaware Keep!"

"You won't bomb the Keep. Half a million people would die."

"A cheap price for you to pay if you can stop the colony—is that it? Perhaps you're willing to die with Delaware, but what about the other Delaware Immortals? There's a rumor all the Harkers but you have already left the Keep—and that you've got a getaway ship waiting. Where are you vising from?"

Zachariah dared not let that challenge drop. Beside him, too, as Sam knew, was a scanning screen that showed the throngs in the Keep. All the Harker prestige—the Immortal prestige—depended on keeping the trust of the commoners. And they would not follow rulers who were not leaders.

Zachariah turned his head and spoke briefly. He said to Sam, and to the Keeps, "No Immortal has left Delaware. I'm speaking from the Harker Council Room. As you see."

The image on the screen changed; it showed the well-known Council Room, empty except for Zachariah, who was seated at the head of a long table before a broadcasting unit.

But now the door opened, and men and women began to come in. Sam recognized Raoul. He was watching for another face he knew.

Was his timing correct?

"The other Families—" Zachariah said. "We'll scan them quickly."

Other Council Rooms showed on the screen—the sanctums of the great Families of Delaware Keep. They were all filling rapidly, the Randolphs, the Wood clan, the Davidsons and Mawsons—but the Harkers were the real rulers of Delaware, as everyone knew. The focus returned to Zachariah. It was the long view, showing Geoffrey and Raoul and a few others seated at the table. Sam looked for Sari and saw her. He wished he could get a closer view. Had she taken the hopped-up narco-dust?

She sat motionless. But suddenly her hands moved together on the table top and clenched violently, and Sam knew.

"Your bluff won't work," Zachariah said. "No Immortal has left the Keep."

"So you're all willing to die rather than give up a little korium," Sam said. "That's your affair—your own lives. But the korium isn't yours. It belongs to the Keep people. They made it and they own it—or should. You've no right to decide whether they should live and die."

"We are the people," Zachariah said.

"You lie," Sam said. "What do you know about us? You're gods. You don't know a thing about the common people, who have to work blindly for reward we'll never lay our hands on. But you'll get those rewards. You'll get them by waiting and doing nothing, while the short-termers work and have children and die—and their children do the same. You can wait to colonize landside, because you'll

live long enough to walk under the stars and the sun and know what it was like on Earth in the old days. You'll go out in ships to the planets... You'll get the rewards. But what about us? We'll die, and our children will die, and our children's children—sweating to build a pyramid we'll never see complete. You're not the people!" His voice raised in a shout. "You're not even human! You're Immortals!"

"We rule by will of the people. Because we're best qualified."

"Qualified?" Sam asked, and then, "Where is Blaze Harker?"

"Not in Delaware Keep at the moment—"

"Tight beam," Sam said.

There was a pause. Then Zachariah made a gesture. All over the Keeps the screens dimmed and went blank. Only two visors carried the conversation now—Sam's, and the Harkers'.

Sam, too, had adjusted to the private tight beam. He said: "I know where Blaze Harker is. I've got telepictures of him. I can broadcast them, and you know what that will do to Harker prestige if the people learn that an Immortal can go insane."

Sam heard signals begin to click behind him. Automatically he translated. *"Kedre Walton entering Harker grounds—"* Almost time.

The signals suddenly began again. Mystified, Sam heard them say, "Listen to the Keeps! Tune back! Listen!"

He didn't want to. This distraction was something he hadn't counted on. There was so much depending on his own split-second timing just now, and on chance and luck—if anything went wrong he was ruined. He didn't want to deflect his attention for a single instant from this flood of pressure he was pouring on the Harkers. But he switched his private screen on briefly—and then for a moment stood tense, listening.

Down there in the Keeps the screens were blank. The people had been cut off from this fascinating and vital debate just at the moment when it was reaching a climax.

And the people didn't like it.

A low roll of anger was rising from the packed thousands. The crowd was shifting uneasily, restlessly, surging in little eddies around the screens as if pressing closer could make the image come back. And the murmur of their anger deepened as the seconds ticked by. Voices rose in thin shouts now and then—the imperative commands of the mob. They would have to be answered. Quickly—very quickly.

Sam whirled to the tight beam where the Harkers waited. From their council room came a distant echo of that same rising murmur of anger. They, too, were watching the temper of the crowds. They, too, knew time was going too fast. Sam grinned. It was perfect. It couldn't be better. He had them on the run now, whether they had realized it yet or not. For until this moment no Immortal had ever known such pressure. They

weren't used to coping with it. And Sam had lived under pressure all his life. He was adjusted to fast thinking. Now if he could only talk fast enough—

"Immortal prestige!" he said rapidly into their private beam. "You've lost all touch with human beings. What do you know about human emotions, you Immortals? Faith—loyalty—do they look so different after a few hundred years? I'm glad I'm a short-termer!"

Zachariah gave him a bewildered look as Sam paused for breath. This didn't ring quite true, and Zachariah was quick to hear the false note. It was all very well to orate when the mob was listening, but these high, abstract things were irrelevant on the private beam. False heroics were for the small minds of the crowd, you could all but hear him thinking. Or for a small mind here, clouded and confused—

Sam saw understanding break across the Immortal's face—too late. Sam had a few more words to hurl into the transmitter, and as he gathered himself to do it he saw the door behind Zachariah swinging open, and knew he had timed himself almost too closely.

"So it's all right for people like you," he shouted, "to pick up some gullible fool of a woman for awhile and kick her out again when you're ready to go back to—"

Kedre Walton came quietly through the door and into the Council Room. From the corner of his eye Sam caught the flash of green-gold hair as Sari's head flung up, saw the hunched tenseness of her shoulders under a gleaming shawl. But his eyes were for Kedre.

She did not seem to have heard. She came quickly across the room, tall, exquisitely fine, holding her head back under the weight of her cascading hair as if it were too heavy for the slender neck. She was unclasping her long cloak as she came, and she let it slip to the floor in heavy, shining folds and hurried forward, her narrow white hands outstretched to Zachariah.

Sam had been sure it would happen so. Between her and Zachariah lay too many decades of past intimacy for her to ignore the tie now. They had created between them in the long orbits of the past a communal flesh and a communal mind that functioned most highly only when they were together. If Zachariah had ever needed this completion, he needed it now. She had come as quickly as she could to give him all her aid. Every eye in the room could see that these two were as nearly one, and in their crises must always be, as any two humans can become.

Sam's gaze swung back to Sari. So did Zachariah's—but just too late. Both of them knew what was coming a split second before it came, but by then it was too late to stop her. The timing was perfect. Shock after shock had hammered upon Sari, already fighting down the cumulative neural explosions

of the adulterated narco-dust Sam had supplied.

And Sari's action was already channeled. She hated Zachariah and Kedre. This was the moment when critical mass was reached.

She was born under the star of exploded Earth. Sari, too, seemed to explode into an incandescence of madness and rage.

Within seconds the assembly of Immortals had degenerated into a primitive struggle as they swarmed to loosen Sari's homicidal grip on Kedre's throat.

Sam threw a switch and saw his face appear in miniature, far below, on the great public televisors. The sullen muttering of the crowd, which had been increasing slowly but steadily, fell to abrupt silence as Sam called,

"Harker! Harker, I can't reach you! Tune in!"

How could they? There was no answer.

"Harker, Harker! *Are you leaving the Keep?*"

Another depth bomb dropped.

Above the rolling thunders of the explosion, above the ominous creaking of tortured impervium over the city, Sam's voice called again.

"Harker, where are you? If the Harkers have left, who's next in authority? *Answer me!*"

Zachariah's face came into sudden, swift focus. He was breathing hard. Blood trickled down his cheek from a long scratch. His face was icily calm.

He said, "We have not left the Keep. We—"

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He did not finish. For the roar of the crowd drowned him out. It was Montana Keep that roared. It was the first time in all Venusian history that the voice of a mob had lifted under a city dome, the first time since the Immortals had assumed control of human affairs that a crowd dared dispute that control.

They disputed it now. If the sound meant anything, they rejected it. Zachariah mouthed silently at them from the screen, no words coming through the vast, voiceless roaring.

For to the crowd it must have seemed that the Keep was already falling. Zachariah, coming back from the urgency of some hidden crisis, breathing hard, blood running down his face—it was a terrifying sight to see. The dome still groaned above them under the impact of the bombs and even this imperturbable Immortal looked panic-stricken at last.

It was terror that made the crowd roar. Surrender was what they roared for, and the volume of the noise mounted as the seconds passed.

And then Sam made his first mistake.

He should have stood back and let events go their way. But the sight of Zachariah's ice-cold calm, even in this tumult, made him want suddenly to smash his fists into the flawless, ageless face, batter it to a more nearly mortal aspect—force the acknowledgment of defeat upon the inflexible Immortal. If there was anything there to admire, Sam did not recognize it.

And because he could not reach Zachariah with his fists, Sam lashed out with his voice.

The first few words he roared at the Immortal no one heard. But when his blunt, red-browed face forced itself into focus upon the screens the shouting of the crowd quieted a little, slowly, until Sam's message came through.

—"surrender now!" Sam was roaring. "No Harker's fit to rule! Give us what we ask, or show us what happened just now in your Council Room! Show us! Show us how sane any Harker is when a crisis comes! No—wait, *I'll* show you! People of the Keeps, wait until you see Blaze Harker and what he—"

The shadow that was the waiting Zachariah made an impatient gesture, and Sam's face and voice faded into the background, still gesturing, still shouting. Zachariah came clear before them, leaning forward, seeming to look down, godlike, over the panic-stricken throngs.

"I have news for you, people of the Keeps," he said quietly. "You're still safe. No bombs have fallen here. No bombs will. This man is—not what he seems. Until now I've kept his secret for him, but this is the time to speak. Joel Reed has told you he never knew his father. He's sworn to wipe out the dishonor of his name and give you a second chance at landside life that Sam Reed robbed you of. You

all know the story of what happened when Sam Reed made you promises." He paused, drew a deep breath.

"This man *is* Sam Reed," he said.

A bewildered buzzing followed the silence when Zachariah's voice ceased. He let them murmur for a moment, then lifted a hand and went on.

"We have definite proof of that —the eye prints and finger prints match. Our investigators don't make mistakes. This is Sam Reed, the swindler, the dream-duster, who's promising you so much. Can you believe anything he says, knowing that? Can you be sure even these pictures of his fleet and their bombs are not false pictures? Nothing he says about the ships or the Harkers or the colonies is trustworthy, and you must know it by now! Sam Reed—speak to the Keeps! Make more promises! No one believes you now—speak to the people you've swindled! Or do you deny who you are? Shall we show the proof now? Answer us, Sam Reed!"

Sam let his face swim into clear focus on the screen. In shadow behind him Zachariah waited, lips a little parted, still breathing hard and the blood running forgotten down his cheek.

Zachariah had lost his head.

For an instant no one knew it, not even Sam. Sam only knew that he must do the fastest thinking he had ever done in his life.

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He had perhaps fifteen seconds that would look like a deliberate pause. Then he must speak. In the back of his brain was the answer. He knew it was there, he could almost touch it and pull it into the light. But for ten of the fifteen seconds he groped in vain.

And then it came to him. Zachariah had made one vast and fatal mistake. The Harkers were not used to quick thinking. For too many centuries they had not been called upon to see all sides of a threatening danger in one glance, evaluate all possibilities and choose by instinct the safest out. And Zachariah was an Immortal. He did not think as normal men think. Zachariah's mind worked by decades and scores—not by the days and weeks of ordinary living.

Sam laughed.

"No," he said, "I won't deny it. I wanted to prove myself to you first. I owed you that. I made a bad mistake and I've got to make amends to you all. But Harker's right—*I am immortal.*"

He waited a moment to let that sink in. "I was forty years old when they blew dream-dust in my face," he said. "For forty years I've been away. Do I look like a man of eighty? Here—look! Am I eighty years old?"

He ducked his head and pushed the eye shells loose, slipped them out, spat out the tooth-cap shells. He pulled the red wig from his head and grinned at them, burning with a confidence that seemed to pour out upon all the Keeps from the thousand screens that mirrored his face.

It was a strong, square, hard-featured face, lines of violence upon it, but no lines of age. Even the bareness of his head was not the bareness of age—the shape of his skull was too sculptured in the strong, full curves of his Harker heritage. It was a vital, virile face—but it was certainly not the face of an Immortal.

"Look at me!" Sam said. "You can see I'm no Immortal. I'm a man like the rest of you. No Immortal was ever born built like me. But I've lived eighty years." He stepped back a little, paused, turned upon them a keen, gray, angry stare.

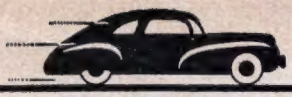
"I was a man like you," he said. "But I've been landside. I've made a great discovery. I've learned why it is the Immortals don't dare let landside colonies get started. You all know how hard they've worked to stop us—now I'm going to tell you the real truth—*why!*

"You can all be immortal!"

It was nearly five minutes before the tumult died. Even then, Sam was very nearly the only listener who heard Zachariah Harker say wearily:

"All right, Reed. You'll get your korium. You think you've won. Now, is this another swindle? If it isn't—*go ahead and give them immortality!*"

TO BE CONCLUDED.



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